

March 2023 ERCOT Monthly Operations Report

Reliability and Operations Subcommittee Meeting

May 4, 2023

Table of Contents

[1. Report Highlights 2](#_Toc130896346)

[2. Frequency Control 3](#_Toc130896347)

[2.1. Frequency Events 3](#_Toc130896348)

[2.2. Responsive Reserve Events 4](#_Toc130896349)

[2.3. Load Resource Events 4](#_Toc130896350)

[3. Reliability Unit Commitment 4](#_Toc130896351)

[4. IRR, Wind, and Solar Generation as a Percent of Load 6](#_Toc130896352)

[5. Largest Net-Load Ramps 8](#_Toc130896353)

[6. Congestion Analysis 9](#_Toc130896354)

[6.1. Notable Constraints 9](#_Toc130896355)

[6.2. Generic Transmission Constraint Congestion 22](#_Toc130896356)

[6.3. Manual Overrides 23](#_Toc130896357)

[6.4. Congestion Costs for Calendar Year 2023 23](#_Toc130896358)

[7. System Events 24](#_Toc130896359)

[7.1. ERCOT Peak Load 24](#_Toc130896360)

[7.2. Load Shed Events 24](#_Toc130896361)

[7.3. Stability Events 24](#_Toc130896362)

[7.4. Notable PMU Events 24](#_Toc130896363)

[7.5. DC Tie Curtailment 24](#_Toc130896364)

[7.6. TRE/DOE Reportable Events 25](#_Toc130896365)

[7.7. New/Updated Constraint Management Plans 25](#_Toc130896366)

[7.8. New/Modified/Removed RAS 25](#_Toc130896367)

[7.9. New Procedures/Forms/Operating Bulletins 25](#_Toc130896368)

[8. Emergency Conditions 25](#_Toc130896369)

[8.1. OCNs 25](#_Toc130896370)

[8.2. Advisories 25](#_Toc130896371)

[8.3. Watches 26](#_Toc130896372)

[8.4. Emergency Notices 26](#_Toc130896373)

[9. Application Performance 26](#_Toc130896374)

[9.1. TSAT/VSAT Performance Issues 26](#_Toc130896375)

[9.2. Communication Issues 26](#_Toc130896376)

[9.3. Market System Issues 27](#_Toc130896377)

[10. Model Updates 27](#_Toc130896378)

[Appendix A: Real-Time Constraints 29](#_Toc130896379)

# Report Highlights

* ERCOT’s maximum peak demand for the month of March 2023 was 53,006 MW on 3/31/23 HE18:00; this was 7,750 MW less than record of 60,756 MW set on 03/05/2019 HE 08:00, and 3,457 MW less than the March 2022 demand of 56,463 MW on 3/12/2022 HE08:00.
* There were 2 frequency events**.**
* There were no instances where Responsive Reserves was deployed.
* 2 DC Tie Curtailment Notice for the DC\_L due to a planned or unplanned outage.
* 5 OCNs issued AANs due to a possible future Emergency condition of reserve capacity deficiency.
* 2 Advisories issued for a geomagnetic disturbance of k-7 and k-8 levels.
* 1 Watch due to SCED Failure.
* There were 50 HRUC commitments
* There were 29 days of congestion on the Bearkat GTC, 28 days on the North Edinburg to Lobo GTC, 26 days on the Panhandle GTC, 22 days on the Nelson Sharpe to Rio Hondo GTC, 20 days on the West Texas Export GTC, 15 days on the McCamey GTC, 15 days on the Valley Export GTC, 3 days on the North to Houston GTC. There was no activity on the remaining GTCs during the month.
* A PVGR Generation Record of 11,937 MW was set on 03/25/2023 at 14:25.
* A PVGR Penetration Record of 29.77% was set on 03/04/2023 at 11:19.

# Frequency Control

## Frequency Events

The ERCOT Interconnection experienced 2 frequency events, which resulted from a unit trip and a load loss. The event average event duration was 00:07:53.

A summary of the frequency events is provided below. The reported frequency events meet one of the following criteria: Delta Frequency is 60 mHz or greater; the MW loss is 350 MW or greater; resource trip event triggered RRS deployment. Frequency events that have been identified as Frequency Measurable Events (FME) for purposes of BAL-001-TRE-2 analysis are highlighted in blue. When analyzing frequency events, ERCOT evaluates PMU data according to industry standards. Events with an oscillating frequency of less than 1 Hz are inter-area, while higher frequencies indicate local events. Industry standards specify that damping ratio for inter-area oscillations should be 3.0% or greater. For the frequency events listed below, the ERCOT system met these standards and transitioned well after each disturbance. In the case of negative delta frequency, the MW Loss column could refer to load loss.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date and Time** | **Delta Frequency** | **Max/Min Frequency** | **Duration of Event** | **PMU Data**  | **MW Loss** | **Load** | **IRR** | **Inertia** |
| **(Hz)** | **(Hz)** | **Oscillation Mode (Hz)** | **Damping Ratio** | **(MW)** | **%**  | **(GW-s)** |
| 3/10/2023 6:58:39 | 0.095 | 59.919 | 00:03:58 | 0.74 | 14% | 461 | 42,508 | 11% | 251,650 |
| 3/26/2023 6:25:00 | -0.087 | 60.096 | 00:11:47 | 0.75 | 16% | -501 | 35,731 | 35% | 206,513 |

(Note: All data on this graph encompasses frequency event analysis based on BAL-001-TRE-2.)



## Responsive Reserve Events

There were 0 events where Responsive Reserve MWs were released to SCED. 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 | Comments |
|  |  |  |  |  |

## Load Resource Events

None.

# Reliability Unit Commitment

ERCOT reports on Reliability Unit Commitments (RUC) monthly. 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.

There were 50 HRUC commitments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resource Location** | **# of Resources** | **Operating Day** | **Total # of Hours Committed** |  **Total MWhs**  | **Reason for Commitment** |
|  NORTH\_CENTRAL, SOUTHERN  | 4 | 03/01/2023 | 23 |  7,031.0  |  SSTILOM8, System Capacity  |
|  NORTH\_CENTRAL  | 1 | 03/02/2023 | 4 |  2,012.0  |  System Capacity  |
|  COAST  | 1 | 03/04/2023 | 3 |  999.0  |  System Capacity  |
|  COAST  | 1 | 03/05/2023 | 5 |  2,426.0  |  System Capacity  |
|  EAST, NORTH, NORTH\_CENTRAL  | 4 | 03/06/2023 | 8 |  3,056.0  |  System Capacity  |
|  NORTH\_CENTRAL  | 1 | 03/08/2023 | 3 |  1,176.0  |  System Capacity  |
|  COAST, NORTH\_CENTRAL  | 4 | 03/09/2023 | 12 |  3,912.0  |  System Capacity  |
|  NORTH\_CENTRAL, SOUTHERN  | 4 | 03/10/2023 | 14 |  2,238.0  |  System Capacity, Valley Reliability |
|  COAST, NORTH\_CENTRAL, SOUTH\_CENTRAL, SOUTHERN  | 7 | 03/17/2023 | 39 |  16,241.0  |  System Capacity  |
|  NORTH\_CENTRAL  | 1 | 03/18/2023 | 2 |  1,006.0  |  System Capacity  |
|  COAST, FAR\_WEST, NORTH\_CENTRAL  | 5 | 03/19/2023 | 14 |  3,314.0  |  System Capacity  |
|  EAST, FAR\_WEST, NORTH\_CENTRAL  | 6 | 03/25/2023 | 31 |  4,934.0  |  System Capacity  |
|  FAR\_WEST, NORTH, NORTH\_CENTRAL  | 3 | 03/26/2023 | 13 |  5,723.0  |  System Capacity  |
|  EAST, NORTH\_CENTRAL  | 3 | 03/27/2023 | 10 |  1,844.0  |  System Capacity  |
|  COAST, EAST, NORTH\_CENTRAL, SOUTH\_CENTRAL  | 4 | 03/28/2023 | 21 |  3,334.0  |  System Capacity  |
|  NORTH\_CENTRAL  | 1 | 03/29/2023 | 2 |  784.0  |  System Capacity  |

# IRR, Wind, and Solar Generation as a Percent of Load

The graph below shows the maximum, minimum and average aggregate solar, wind and IRR output as a percentage of total ERCOT load when evaluated as 10-minute averaged intervals, over the past 13 months. Current wind and solar generation and penetration records are listed in the footnote below[[1]](#footnote-1). Maximum IRR penetration for the month was 68.3% on 03/25/2023 interval ending 10:10 and minimum IRR penetration for the month was 9.7% on 03/25/2023 interval ending 20:10.



During the hour of peak load for the month, hourly integrated wind generation was 20,789 MW and solar generation was 3.2 MW. The graph below shows the wind and solar penetration percentage during the hour of the peak load in the last 13 months.



Lastly, the graph below shows the minimum wind, solar and IRR output during the peak load hour as a percentage of the daily peak load for every day in the month.



# Largest Net-Load Ramps

The net-load ramp is defined as the change in net-load (load minus wind and PVGR generation) during the defined time horizon. Such a variation in net-load needs to be accommodated in grid operations to ensure that the reliability of the grid is satisfactorily maintained. The largest net-load ramp during 5-min, 10-min, 15-min, 30-min and 60-min in March 2023 was 1,108 MW, 1,676 MW, 2,204 MW, 4,228 MW, and 7,231 MW, respectively. The comparison with respect to the historical values is given in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Month and Year** | **5 min** | **10 min** | **15 min** | **30 min** | **60 min** |
| Mar 2014 | 822 MW | 1,381 MW | 1,895 MW | 3,237 MW | 5,257 MW |
| Mar 2015 | 956 MW | 1,615 MW | 2,146 MW | 3,341 MW | 5,661 MW |
| Mar 2016 | 979 MW | 1,635 MW | 2,149 MW | 2,967 MW | 5,070 MW |
| Mar 2017 | 888 MW | 1,522 MW | 1,838 MW | 3,321 MW | 5,395 MW |
| Mar 2018 | 1,375 MW | 1,688 MW | 2,069 MW | 3,576 MW | 5,957 MW |
| Mar 2019 | 919 MW | 1,511 MW | 1,932 MW | 3,194 MW | 5,596 MW |
| Mar 2020 | 979 MW | 1,406 MW | 1,650 MW | 2,642 MW | 4,660 MW |
| Mar 2021 | 926 MW | 1,556 MW | 1,945 MW | 3,282 MW | 6,104 MW |
| Mar 2022 | 1,192 MW | 2,155 MW | 3,015 MW | 5,714 MW | 10,750 MW |
| March 2023 | 1,108 MW03/17/2023(IE 06:03) | 1,676 MW03/24/2023(IE 06:07) | 2,204 MW03/17/2023(IE 06:13) | 4,228 MW03/18/2023(IE 19:12) | 7,231 MW03/18/2023(IE 19:22) |
| All Months in 2014-2023 | 1,647 MW05/25/22(IE 17:06) | 2,506 MW1/12/2023(IE 17:16) | 3,431 MW1/12/2023(IE 17:18) | 6,468 MW1/12/2023(IE 17:30) | 11,133 MW1/12/2023(IE 17:58) |

# Congestion Analysis

## Notable Constraints

Nodal protocol section 3.20 specifies that ERCOT shall identify transmission constraints that are binding in Real-Time three or more Operating Days 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 for a calendar month. These constraints are detailed in the table below, including approved transmission upgrades from TPIT that may provide some congestion relief based on ERCOT’s engineering judgement. Rows highlighted in blue indicate the congestion was affected by one or more outages. For a list of all constraints activated in SCED, please see Appendix A at the end of this report.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Contingency Name** | **Overloaded Element** | **Contingency Name** | **Overloaded Element** | **# of Days Constraint Binding** | **Congestion Rent** | **Transmission Project** |
|  |
| MMDSQAL5 | MDSSW\_MR1L | MAN\_DBL\_MDSSW-ODEHB\_and\_CONSW-QALSW\_345kV\_DBLCKT | Midessa South Sw 138kV | 28 | $56,948,217.89 |  |  |
| MCONMDS5 | 6051\_\_A | Manual\_SGL\_CONSW-MDSSW\_345kV\_SglCkt | Quail Switch - Odessa Ehv Switch 345kV | 9 | $18,351,298.08 |  |  |
| SSKYSB28 | 15081\_\_Z | SKYWEST to SPRABERRY SWITCH LIN 1 | South Midland - Consavvy Switch 138kV | 15 | $15,310,947.61 |  |  |
| BASE CASE | PNHNDL | Basecase | PNHNDL GTC | 22 | $14,947,614.63 |  |  |
| DTVWJON5 | 6033\_\_A | TVWSW TO CPSES 345 AND CPSES TO JONSW 345 DBLCKT | Comanche Peak Ses - Mitchell Bend Switch 345kV | 2 | $12,109,054.41 |  |  |
| SBWDDBM5 | LPLMK\_LPLNE\_1 | BLACKWATER DRAW SWITCH to DOUBLE MOUNTAIN SWITCH LIN 1 | Mackenzie Substation - Northeast Substation 115kV | 18 | $11,531,012.76 |  |  |
| BASE CASE | WESTEX | Basecase | WESTEX GTC | 10 | $10,198,113.31 |  |  |
| BASE CASE | NE\_LOB | Basecase | NE\_LOB GTC | 26 | $6,741,791.37 | The Lower Rio Grande Valley (LRGV) System Enhancement Project (21RPG017) will improve the NorthEd\_LoboGTC to support up to 80% of total wind and solar generation capacity in the LRGV area. |  |
| XNED258 | BURNS\_RIOHONDO\_1 | NORTH EDINBURG TRX 1382 345/138 | Burns Sub - Rio Hondo 138kV | 6 | $6,592,698.66 |  |  |
| DCAGCI58 | BERGHE\_AT1H | Cagnon-Kendal 345 &Cico-Mengcr 138 | Bergheim 345kV | 10 | $5,870,622.39 |  |  |
| SNATBEA8 | 6144\_\_A | NATURAL DAM to BEALS CREEK SUB LIN \_A | Big Spring West - Stanton East 138kV | 26 | $5,792,534.35 | Oncor\_FW\_71989\_Big Spring West - Stanton East 138 kV Line (71989) |  |
| MHARNED5 | BURNS\_RIOHONDO\_1 | Manual dbl ckt for NEDIN-BONILLA 345kV & RIOH-PRIM138kV | Burns Sub - Rio Hondo 138kV | 18 | $5,335,460.67 |  |  |
| SBNBPK25 | 6005\_\_A | PARKER SWITCH to BENBROOK SWITCH LIN \_A | Benbrook Switch - Parker Switch 345kV | 2 | $5,006,606.96 |  |  |
| BASE CASE | BEARKT | Basecase | BEARKT GTC | 28 | $4,718,407.54 |  |  |
| DSALKLN5 | 630\_\_B | SALSW TO KLNSW 345 DBLCKT | Harker Heights South - Killeen Switch 138kV | 12 | $4,686,570.74 |  |  |
| SLOBSA25 | CATARI\_PILONC1\_1 | Fowlerton to LOBO 345 LIN1 | Catarina - Piloncillo 138kV | 15 | $3,765,828.79 | AEP\_TCC\_AshertontoPiloncillo138kVLine\_rebuild (73100) |  |
| DMGSBTR5 | 6036\_\_A | MGSES TO CCRSW 345 AND BTRCK TO MGSES 345 DBLCKT | Tonkawa Switch - Morgan Creek Ses 345kV | 9 | $3,056,548.73 |  |  |
| BASE CASE | HHGTOM\_1 | Basecase | Omega - Horse Hollow Generation Tie 345kV | 7 | $3,025,884.93 |  |  |
| DBIGKEN5 | HAMILT\_MAVERI1\_1 | Bighil-Kendal 345kV | Hamilton Road - Maverick 138kV | 8 | $3,019,637.96 |  |  |
| SGRICOL5 | PAWNEE\_TANGO1\_1 | Grissom to COLETO CREEK LIN 1 | Pawnee Switching Station - Tango 345kV | 13 | $2,978,445.30 |  |  |
| SLOBSA25 | LARDVN\_LASCRU1\_1 | Fowlerton to LOBO 345 LIN1 | Laredo Vft North - Las Cruces 138kV | 13 | $2,769,972.58 | AEP\_TCC\_Laredo VFT North - North Laredo SS 138 kV Line Rebuild (58008) |  |
| SFTWW\_D8 | WD\_RDWELLS\_1 | West Denton to FORT WORTH SUBSATION LIN 1 | West Denton - Rd Wells Interchange 138kV | 3 | $2,249,756.76 |  |  |
| DCALBEC8 | E1\_R2\_1 | Calavers-Kirby&Beck\_Rd 138kV | Merida - Wstside 138kV | 7 | $2,042,878.95 |  |  |
| SVCAMIL8 | SCARBI\_TITAN\_1\_1 | MILITARY HIGHWAY AEP to VILLA CAVAZOS LIN 1 | Titan Substation - South Carbide 138kV | 1 | $1,924,334.22 |  |  |
| SSTILOM8 | SCARBI\_TITAN\_1\_1 | STILLMAN to LOMA ALTA SUBSTATION LIN 1 | Titan Substation - South Carbide 138kV | 1 | $1,719,927.13 |  |  |
| DFPPHOL5 | 190T152\_1 | Fppyd2-Lytton\_S & Holman 345kV | Sim Gideon - Winchester 138kV | 1 | $1,445,531.56 |  |  |
| DVANEDN8 | DANEVA\_69\_1 | VANBLT-ETP 138kV&ELTORSS-EDNAS 69kV | Danevang Switching Station 138kV | 16 | $1,414,918.13 |  |  |
| DWHIGIB8 | LON\_HI\_WWKS\_T1\_1 | Loss of (White Point & Nueces Bay 138kV) and (White Point & Portland & Gibbs 138kV) | Lon Hill - Calallan Waterworks Tap 69kV | 3 | $1,403,521.19 |  |  |
| DSCOTKW5 | 15060\_\_B | SCOSW TO TKWSW 345 DBLCKT | Koch Tap - Vealmoor 138kV | 4 | $1,233,530.11 |  |  |
| DEMSDEN8 | 6270\_\_D | EMSES TO DENSW 138 DBLCKT | Wagley Robertson - Hicks Switch 138kV | 1 | $1,216,770.88 |  |  |
| DCAGCO58 | BERGHE\_AT1H | Cagnon-Kendal 345 & Cico-Comfor 138 | Bergheim 345kV | 6 | $1,181,230.74 |  |  |
| DLARAN89 | SCARBI\_TITAN\_1\_1 | LA\_PALMA - VCAVAZOS (138) & RANGERVL (69) | Titan Substation - South Carbide 138kV | 1 | $1,135,183.88 |  |  |
| MBOGTID8 | CO\_PL\_84\_A | MANUALS BOG - PIR 88 & TRV - TID 06 | Conial - Philip 138kV | 6 | $1,125,879.59 |  |  |
| DBIGKEN5 | ESCOND\_GANSO1\_1 | Bighil-Kendal 345kV | Escondido - Ganso 138kV | 8 | $1,080,576.58 |  |  |
| DRILKRW5 | OKLA\_RILEY2\_1 | RILEY TO KRWSW 345 DBLCKT | Riley - Oklaunion 345kV | 2 | $1,075,612.78 |  |  |
| SALAN\_28 | CELANE\_KLEBER1\_1 | BARNEY DAVIS to ALAZAN LIN 1 | Celanese Bishop - Kleberg Aep 138kV | 17 | $1,020,710.72 |  |  |
| SI\_DI\_38 | I\_DUPP\_I\_DUPS1\_1 | DUPONT SWITCH - INGLESIDE to INGLESIDE COGEN SWITCH LIN 1 | Dupont Pp1 - Ingleside - Dupont Switch - Ingleside 138kV | 9 | $971,622.20 |  |  |
| DKOCNUE8 | MCKENZ\_WESTSI1\_1 | Koch Upriver - Tortuga & Lon Hill - Nueces Bay 138KV | Mckenzie - Westside Aep 138kV | 4 | $833,375.90 |  |  |
| XLOB258 | PAWNEE\_TANGO1\_1 | LOBO TRX A1 345/138 | Pawnee Switching Station - Tango 345kV | 4 | $751,377.65 |  |  |
| DBWNAMO5 | 134T429\_1 | Twinbu-Sarc&Amoscr 345kV | Schkad - San Angelo Power Station 138kV | 4 | $667,747.49 |  |  |
| BASE CASE | JFSSC\_06\_A | Basecase | Jefferson - South Channel 138kV | 6 | $633,817.02 |  |  |
| MHARNED5 | HAINE\_\_LA\_PAL1\_1 | Manual dbl ckt for NEDIN-BONILLA 345kV & RIOH-PRIM138kV | Haine Drive - La Palma 138kV | 13 | $608,273.44 |  |  |
| SKLELOY8 | LOYOLA\_69\_1 | KLEBERG AEP to LOYOLA SUB LIN 1 | Loyola Sub 138kV | 16 | $581,181.15 |  |  |
| DMTSCOS5 | 6437\_\_F | DMTSW TO SCOSW 345 DBLCKT | Knapp - Scurry Chevron 138kV | 4 | $459,403.20 |  |  |
| DELMSAN5 | PAWNEE\_SPRUCE\_1 | Elmcreek-Sanmigl 345kV | Pawnee Switching Station - Calaveras 345kV | 3 | $430,882.09 |  |  |
| MCONLNG5 | HARGRO\_TWINBU1\_1 | MAN\_DBL\_'CONSW-MGSES\_and\_CONSW-LNGSW\_345kV\_DBLCKT | Hargrove - Twin Buttes 138kV | 3 | $415,958.08 |  |  |
| SCARFRI8 | ATSO\_SONR1\_1 | Carver to FRIEND RANCH LIN 1 | Atlantic Sonora - Sonora 69kV | 6 | $403,103.81 |  |  |
| DCC1DUKE | BURNS\_RIOHONDO\_1 | Loss of DUKE (train) | Burns Sub - Rio Hondo 138kV | 5 | $402,379.39 | STEC\_71930\_RioHondo\_Burns\_Upgrade (71930) |  |
| DCAGCI58 | 255T279\_1 | Cagnon-Kendal 345 &Cico-Mengcr 138 | Medina Lake - Pipe Creek 138kV | 3 | $359,118.13 |  |  |
| SCMNCPS5 | 651\_\_B | COMANCHE SWITCH (Oncor) to COMANCHE PEAK SES LIN \_A | Comanche Tap - Comanche Switch (Oncor) 138kV | 7 | $355,463.37 |  |  |
| DTWIDIV5 | REDCREEK\_T2L | TWINBU-DVIDE 345KV | San Angelo Red Creek 138kV | 7 | $333,319.95 |  |  |
| BASE CASE | MCCAMY | Basecase | MCCAMY GTC | 9 | $317,493.58 |  |  |
| DMOLLO58 | PAWNEE\_TANGO1\_1 | MOLINA - LOBO 138 & LOBO - CENIZO 345 | Pawnee Switching Station - Tango 345kV | 4 | $317,099.43 |  |  |
| SBE2ASH8 | TURTLECK\_WCRYS\_1 | BEVO to ASHERTON LIN 1 | Turtle Creek Switching Station - West Crystal City Sub 69kV | 4 | $287,364.94 |  |  |
| SBGLTWI8 | CONCHO\_SANW0\_1 | TWIN BUTTES to HARGROVE LIN 1 | San Angelo Concho - San Angelo Lake Nasworthy 69kV | 4 | $281,958.75 |  |  |
| BASE CASE | NELRIO | Basecase | NELRIO GTC | 15 | $275,893.72 | The Lower Rio Grande Valley (LRGV) System Enhancement Project (21RPG017) will cause there to be no stability constraint for NelsonSharpe\_RioHondoGTC under normal conditions. |  |
| DTWIDIV5 | 134T429\_1 | TWINBU-DVIDE 345KV | Schkad - San Angelo Power Station 138kV | 7 | $275,290.66 |  |  |
| STANPAW5 | BEEVIL\_NORMAN1\_1 | TANGO to PAWNEE SWITCHING STATION LIN 1 | Beeville - Normanna 69kV | 4 | $274,731.21 |  |  |
| SN\_SLON5 | BURNS\_RIOHONDO\_1 | LON HILL to NELSON SHARPE LIN 1 | Burns Sub - Rio Hondo 138kV | 4 | $273,895.19 | STEC\_71930\_RioHondo\_Burns\_Upgrade (71930) |  |
| BASE CASE | VALEXP | Basecase | VALEXP GTC | 15 | $258,698.57 |  |  |
| MCONLNG5 | 6217\_\_A | MAN\_DBL\_'CONSW-MGSES\_and\_CONSW-LNGSW\_345kV\_DBLCKT | Willow Valley Switch - Gail Sub 138kV | 3 | $246,538.18 |  |  |
| DBIGKEN5 | HAMILT\_MAXWEL1\_1 | Bighil-Kendal 345kV | Hamilton Road - Maxwell 138kV | 4 | $235,303.25 |  |  |
| SBRAUVA8 | HAMILT\_MAVERI1\_1 | ODLAW SWITCHYARD to ASPHALT MINES LIN 1 | Hamilton Road - Maverick 138kV | 5 | $231,533.99 |  |  |
| SLOBSA25 | ASHERT\_CATARI1\_1 | Fowlerton to LOBO 345 LIN1 | Asherton - Catarina 138kV | 7 | $213,303.80 | AEP\_TCC\_AshertontoPiloncillo138kVLine\_rebuild (73100) |  |
| SVICCO28 | COLETO\_VICTOR2\_1 | COLETO CREEK to VICTORIA LIN 1 | Coleto Creek - Victoria 138kV | 3 | $181,071.89 |  |  |
| DTWIDIV5 | SAPOWE\_SAST1\_1 | TWINBU-DVIDE 345KV | San Angelo Power Station - San Angelo South Tap 138kV | 3 | $169,410.82 |  |  |
| DBWNAMO5 | REDCREEK\_T2L | Twinbu-Sarc&Amoscr 345kV | San Angelo Red Creek 138kV | 6 | $167,045.65 |  |  |
| DSWETKW5 | 6036\_\_A | SWESW TO TKWSW 345 DBLCKT | Tonkawa Switch - Morgan Creek Ses 345kV | 6 | $139,379.47 |  |  |
| XBLE58 | SAR\_FRAN\_1 | BLESSING TRX 1382 345/138 | Sargent Sub - Franklins Camp Sub 69kV | 7 | $133,883.64 |  |  |
| SN\_SLON5 | LASPUL\_RAYMND1\_1 | LON HILL to NELSON SHARPE LIN 1 | Las Pulgas - Raymondville 2 138kV | 16 | $110,368.71 |  |  |
| DMGSBIT5 | 6036\_\_A | CCRSW TO SWESW 345 AND BTRCK TO MGSES 345 DBLCKT | Tonkawa Switch - Morgan Creek Ses 345kV | 6 | $97,188.93 |  |  |
| SWHILON5 | PAWNEE\_TANGO1\_1 | LON HILL to WHITEPOINT LIN 1 | Pawnee Switching Station - Tango 345kV | 3 | $91,709.17 |  |  |
| DBIGKEN5 | TREADW\_YELWJC1\_1 | Bighil-Kendal 345kV | Yellow Jacket - Treadwell 138kV | 4 | $87,967.59 |  |  |
| DJACALV8 | MYRA\_VAL\_1 | JACKCNTY TO BOW 138 AND WISECNTY TO ALVRD 138 DBLCKT | Myra - Valley View Bepc 138kV | 3 | $62,667.73 | BEPC\_TPIT4645\_MYRA\_SPRING (4645) |  |
| SMADSAP8 | MADDUX\_SAPOWE2\_1 | MADDUX to SAN ANGELO POWER STATION LIN 1 | Maddux - San Angelo Power Station 138kV | 10 | $54,891.66 |  |  |
| DSALHUT5 | 270\_\_A | SALSW - HUTTO 345KV | Temple Switch - Knob Creek Switch 345kV | 3 | $48,007.04 |  |  |
| DCOLFA59 | PAWNEE\_TANGO1\_1 | COLETO - GRISSOM (345) & VICTORIA - FANNINS (69) | Pawnee Switching Station - Tango 345kV | 5 | $40,150.28 |  |  |
| DGRSPKR5 | 6377\_\_A | GRSES TO PKRSW 345 DBLCKT | Barton Chapel Wind Farm - Oran Sub 138kV | 4 | $39,979.11 |  |  |
| XBGL88 | BISON\_STRS1\_1 | BIG LAKE TRX PS\_1 138/138 | Bison - Strauss Rea 69kV | 3 | $31,934.40 |  |  |
| DSWECBF5 | BLUF\_C\_MULBER1\_1 | SWESW TO CBFSW 345 DBLCKT | Bluff Creek - Abilene Mulberry Creek 345kV | 5 | $30,269.33 |  |  |
| SCRMSAR8 | STMBOA\_WINT1\_1 | SAN ANGELO RED CREEK to Weiss LIN 1 | Steamboat - Winters 69kV | 3 | $26,082.74 |  |  |
| SCT2CAR8 | HAMILT\_MAVERI1\_1 | CAUTHORN to Carver LIN 1 | Hamilton Road - Maverick 138kV | 3 | $23,773.84 |  |  |
| SBRACAL8 | D3\_G3\_1 | CALAVERAS to BRAUNIG LIN 1 | Eagleck - Elmendrf 138kV | 3 | $18,218.35 |  |  |
| SHOLWES8 | HOLLY4\_SOUTH\_1\_1 | WESTSIDE AEP to HOLLY LIN 1 | Holly - Southside 138kV | 3 | $16,981.31 | AEP\_TCC\_RebuildHolly-Southside (45566) |  |
| DCENRI35 | PAWNEE\_TANGO1\_1 | Cenizo-Delsol ckt 1(345)&Rio\_Brav-Zapata(138) | Pawnee Switching Station - Tango 345kV | 3 | $12,671.57 |  |  |
| SLOBSA25 | FREER\_LOBO1\_1 | Fowlerton to LOBO 345 LIN1 | Lobo - Freer 69kV | 3 | $12,150.14 |  |  |
| SMV\_PAR8 | RIOHND\_ERIOHND\_1 | PAREDES SWITCHING STATION to CENTRAL AVENUE SUB LIN 1 | Rio Hondo - East Rio Hondo Sub 138kV | 3 | $3,051.06 | STEC\_6687\_RebuildRioHondo-ERioHondo (6687) |  |
| SW\_SBRN5 | 15010\_\_B | wett\_sand\_bluff to Bernoulli LIN 1 | East Stiles - Blissard Sub 138kV | 3 | $1,416.65 | Oncor\_FW\_61516\_Blissard - East Stiles 138 kV Line Section (61516) |  |

## Generic Transmission Constraint Congestion

There were 29 days of congestion on the Bearkat GTC, 28 days on the North Edinburg to Lobo GTC, 26 days on the Panhandle GTC, 22 days on the Nelson Sharpe to Rio Hondo GTC, 20 days on the West Texas Export GTC, 15 days on the McCamey GTC, 15 days on the Valley Export GTC, 3 days on the North to Houston GTC. 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

None

## Congestion Costs for Calendar Year 2023

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** | **Overloaded Element** | **# of 5-min SCED** | **Estimated Congestion Rent** |
| MAN\_DBL\_MDSSW-ODEHB\_and\_CONSW-QALSW\_345kV\_DBLCKT | Midessa South Sw 138kV | 8176 |  $66,518,832.32  |
| SKYWEST to SPRABERRY SWITCH LIN 1 | Consavvy Switch - Cottonfield Sub 138kV | 2887 |  $44,628,271.32  |
| Basecase | WESTEX GTC | 8617 |  $36,999,239.11  |
| SKYWEST to SPRABERRY SWITCH LIN 1 | South Midland - Consavvy Switch 138kV | 6434 |  $27,091,920.42  |
| Basecase | PNHNDL GTC | 6715 |  $19,955,283.28  |
| Manual\_SGL\_CONSW-MDSSW\_345kV\_SglCkt | Quail Switch - Odessa Ehv Switch 345kV | 1333 |  $18,415,255.04  |
| Basecase | NE\_LOB GTC | 9734 |  $17,394,909.73  |
| BLACKWATER DRAW SWITCH to DOUBLE MOUNTAIN SWITCH LIN 1 | Mackenzie Substation - Northeast Substation 115kV | 4212 |  $16,119,310.53  |
| SALSW TO KLNSW 345 DBLCKT | Harker Heights South - Killeen Switch 138kV | 5905 |  415,128,017.56  |
| Basecase | BEARKT GTC | 14189 |  $14,192,301.65  |
| TVWSW TO CPSES 345 AND CPSES TO JONSW 345 DBLCKT | Comanche Peak Ses - Mitchell Bend Switch 345kV | 392 |  $12,109,054.41  |
| NATURAL DAM to BEALS CREEK SUB LIN \_A | Big Spring West - Stanton East 138kV | 9723 |  $11,518,561.81  |
| Manual dbl ckt for NEDIN-BONILLA 345kV & RIOH-PRIM138kV | Burns Sub - Rio Hondo 138kV | 4980 |  $10,344,005.27  |
| Fowlerton to LOBO 345 LIN1 | Catarina - Piloncillo 138kV | 5308 |  $10,032,495.74  |
| Basecase | Omega - Horse Hollow Generation Tie 345kV | 4991 |  $9,119,609.38  |
| SCOSW TO TKWSW 345 DBLCKT | Koch Tap - Vealmoor 138kV | 2930 |  $7,991,863.22  |
| NORTH EDINBURG TRX 1382 345/138 | Burns Sub - Rio Hondo 138kV | 733 |  $6,592,698.66  |
| Cagnon-Kendal 345 &Cico-Mengcr 138 | Bergheim 345kV | 1794 |  $6,580,533.22  |
| Elmcreek-Sanmigl 345kV | Pawnee Switching Station - Calaveras 345kV | 3527 |  $6,375,651.40  |
| Bighil-Kendal 345kV | Hamilton Road - Maverick 138kV | 3770 |  $5,660,640.67  |

# System Events

## ERCOT Peak Load

The unofficial ERCOT peak load[[2]](#footnote-2) for the month was 53,006 MW and occurred on 03/31/2023, during hour ending 18:00.

## 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 PMU events outside of those reported in section 2.1.

## DC Tie Curtailment

There were two DC tie curtailments.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **DC Tie** | **Curtailing Period** | **# of Tags Curtailed** | **Initiating Event** | **Curtailment Reason[[3]](#footnote-3)[[4]](#footnote-4)** |
| 3/8/2023  – 3/10/2023 | DC\_L | HE 17 – HE 24 HE 01 – HE 24HE 01 - 10 | 5 | Forced Outage | Planned or Unplanned Outage |
| 3/24/2023 – 3/25/2023 | DC\_L | HE 20 – HE 24HE 01 – HE 3 | 3 | Forced Outage | Planned or Unplanned Outage |

## TRE/DOE Reportable Events

* Oncor submitted a DOE-OE-417 for 03/02/2023. Reportable Event Type: Loss of electric service.
* Oncor submitted an EOP-004-4 for 03/03/2023. Reportable Event Type: Damage or destruction of a facility.
* Orsted Onshore North America submitted a DOE-OE-417 for 03/08/2023. Reportable Event Type: Damage or destruction of a facility.
* Oncor submitted an EOP-004-4 for 03/08/2023. Reportable Event Type: Damage or destruction of a facility.
* Oncor submitted a DOE-OE-417 for 03/08/2023. Reportable Event Type: Damage or destruction of a facility.
* AEP submitted a DOE-OE-417 for 03/08/2023. Reportable Event Type: Transmission loss.
* Oncor submitted an EOP-004-4 for 03/23/2023. Reportable Event Type: Damage or destruction of a facility.
* Oncor submitted a DOE-OE-417 for 03/23/2023. Reportable Event Type: Damage or destruction of a facility.
* BPUB submitted a DOE-OE-417 for 03/28/2023. Reportable Event Type: Suspicious activity to its facility.

## New/Updated Constraint Management Plans

There was one modified CMP, MP\_2023\_01.

## New/Modified/Removed RAS

None.

## New Procedures/Forms/Operating Bulletins

|  |  |  |
| --- | --- | --- |
| **Date** | **Subject** | **Bulletin No.** |
| 3/30/2023 | Real Time Desk V1 Rev 86 | 1075 |
| 3/30/2023 | Reliability Risk Desk Operating Procedure V1 Rev 31 | 1076 |
| 3/30/2023 | Reliability Unit Commitment V1 Rev 73 | 1077 |
| 3/30/2023 | Scripts V1 Rev 46 | 1078 |
| 3/30/2023 | Shift Supervisor Desk V1 Rev 84 | 1079 |
| 3/30/2023 | Transmission and Security Desk V1 Rev 100 | 1080 |

# Emergency Conditions

## OCNs

|  |  |
| --- | --- |
| **Date and Time** | **Message** |
| March 16, 2023 10:00 CPT | At 10:00, ERCOT issued an AAN due to a possible future Emergency Condition of reserve capacity deficiency beginning March 20, 2023 HE 0700 - HE 1000. ERCOT may Delay/Withdraw Approved or Accepted Resource Outages. ERCOT may seek 3,071 MW from an OAE and then make the OSA. On March 17, 2023 at 10:00 ERCOT will execute an OAE if deemed necessary. |
| March 17, 2023 10:00 CPT | At 10:00, ERCOT has updated the AAN for a possible future Emergency Condition of reserve capacity deficiency beginning March 20, 2023 HE 0700 - HE 1000 based on changed conditions. At this time, ERCOT does not seek additional capacity and will not be issuing an OSA. ERCOT has posted an updated AAN Planning Assessment for reference. |
| March 29, 2023 09:30 CPT | At 09:30, ERCOT issued an AAN due to a possible future Emergency Condition of reserve capacity deficiency beginning April 04, 2023 HE 1600 - HE 2300. ERCOT may Delay/Withdraw Approved or Accepted Resource Outages. ERCOT may seek 7,808 MW from an OAE and then make the OSA. On March 30, 2023 at 09:30 ERCOT will execute an OAE if deemed necessary. |
| March 30, 2023 11:00 CPT | At 11:00, ERCOT has updated the AAN for a possible future Emergency Condition of reserve capacity deficiency beginning Tuesday, April 04, 2023 HE 16:00 until HE 23:00. ERCOT may Delay/Withdraw Approved or Accepted Resource Outages. ERCOT may seek 1,100 MW from an OAE and then make the OSA. On Thursday, March 30, 2023 at 11:00 ERCOT will execute an OSA if deemed necessary. Please notify the ERCOT Client Services if a specific resource cannot be considered in the OSA. |
| March 31, 2023 10:00 CPT | At 10:00, ERCOT has updated the AAN for a possible future Emergency Condition of reserve capacity deficiency beginning Tuesday, April 4, 2023 HE 1600 - HE 2300 based on changed conditions. QSEs have updated their Resource COPs and the Outage Scheduler. At this time, ERCOT does not seek additional capacity and will not be issuing an OSA. ERCOT has posted an updated AAN Planning Assessment for reference. |

## Advisories

|  |  |
| --- | --- |
| **Date and Time** | **Message** |
| March 23, 2023 10:47 CPT | Advisory issued for a geomagnetic disturbance of [K-7 level] until [3/23/2023 at 13:00]. |
| Mar 23, 2023 18:54 CPT | Advisory issued for a geomagnetic disturbance Alert of K-7 on 3/23/2023 at 18:54. |
| March 23, 2023 23:04 CPT | Advisory issued for a geomagnetic disturbance Alert of K-8 on 3/23/2023 at 23:04. |

## Watches

|  |  |
| --- | --- |
| **Date and Time** | **Message** |
| March 28, 2023 10:40 CPT | ERCOT issued a Watch due to SCED Failure. |

## Emergency Notices

None.

# Application Performance

## TSAT/VSAT Performance Issues

None.

## Communication Issues

None.

## Market System Issues

None.

# Model Updates

The Downstream Production Change (DPC) process allows ERCOT to make changes in the on-line Network Operations Model without loading a completely new model. The purpose of this process is to allow for reliable grid operations as system conditions change between designated Network Operations Model database loads. The DPC process is limited in scope to just those items listed below, with equipment ratings updates being the most common. ERCOT has seen a rise in the use of the DPC process to make on-line updates to the Network Operations Model in recent years, instead of through the standard Network Operations Model Change Request process.

* Static Line ratings (Interim Update)
* Dynamic Line ratings (non-Interim Update)
* Autotransformer ratings (non-Interim Update)
* Breaker and Switch Normal status (Interim Update)
* Contingency Definitions (Interim Update)
* RAP and RAS changes or additions (Interim Update)
* Net Dependable and Reactive Capability (NDCRC) values (Interim Update)
* Impedance Updates (non-Interim)



|  |  |
| --- | --- |
| **Transmission Operator** | **Number of DPCs** |
| AEP TEXAS COMPANY (TDSP) | 2 |
| BRAZOS ELECTRIC POWER CO OP INC (TDSP) | 0 |
| BROWNSVILLE PUBLIC UTILITIES BOARD (TDSP) | 1 |
| BRYAN TEXAS UTILITIES (TDSP) | 0 |
| CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (TDSP) | 8 |
| CITY OF AUSTIN DBA AUSTIN ENERGY (TDSP) | 0 |
| CITY OF COLLEGE STATION (TDSP) | 0 |
| CITY OF GARLAND (TDSP) | 0 |
| CPS ENERGY (TDSP) | 5 |
| DENTON MUNICIPAL ELECTRIC (TDSP) | 1 |
| ELECTRIC TRANSMISSION TEXAS LLC (TDSP) | 1 |
| ERCOT | 2 |
| LCRA TRANSMISSION SERVICES CORPORATION (TDSP) | 21 |
| LONE STAR TRANSMISSION LLC (TSP) | 1 |
| ONCOR ELECTRIC DELIVERY COMPANY LLC (TDSP) | 2 |
| PEDERNALES ELECTRIC CO OP INC (TDSP) | 0 |
| RAYBURN COUNTRY CO OP DBA RAYBURN ELECTRIC (TDSP) | 0 |
| SHARYLAND UTILITIES LP (TDSP) | 0 |
| SOUTH TEXAS ELECTRIC CO OP INC (TDSP) | 0 |
| TEXAS MUNICIPAL POWER AGENCY (TDSP) | 0 |
| TEXAS-NEW MEXICO POWER CO (TDSP) | 0 |
| WIND ENERGY TRANSMISSION TEXAS LLC (TSP) | 1 |

# Appendix A: Real-Time Constraints

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | Month of the Year | Contingency Name | Overloaded Element | From Station | To Station | Count of Days |
| 2023 | 3 | SNATBEA8 | 6144\_\_A | BSPRW | STASW | 30 |
| 2023 | 3 | MMDSQAL5 | MDSSW\_MR1L | MDSSW | MDSSW | 30 |
| 2023 | 3 | BASE CASE | BEARKT | n/a | n/a | 28 |
| 2023 | 3 | BASE CASE | NE\_LOB | n/a | n/a | 27 |
| 2023 | 3 | BASE CASE | PNHNDL | n/a | n/a | 25 |
| 2023 | 3 | SBWDDBM5 | LPLMK\_LPLNE\_1 | LPLMK | LPLNE | 25 |
| 2023 | 3 | SN\_SLON5 | LASPUL\_RAYMND1\_1 | LASPULGA | RAYMND2 | 22 |
| 2023 | 3 | BASE CASE | NELRIO | n/a | n/a | 21 |
| 2023 | 3 | SLOBSA25 | CATARI\_PILONC1\_1 | PILONCIL | CATARINA | 20 |
| 2023 | 3 | SSKYSB28 | 15081\_\_Z | SMIDLAND | CONSW | 20 |
| 2023 | 3 | SALAN\_28 | CELANE\_KLEBER1\_1 | CELANEBI | KLEBERG | 20 |
| 2023 | 3 | SLOBSA25 | CATARI\_PILONC1\_1 | CATARINA | PILONCIL | 20 |
| 2023 | 3 | MHARNED5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 20 |
| 2023 | 3 | DVANEDN8 | DANEVA\_69\_1 | DANEVA | DANEVA | 19 |
| 2023 | 3 | SKLELOY8 | LOYOLA\_69\_1 | LOYOLA | LOYOLA | 19 |
| 2023 | 3 | BASE CASE | WESTEX | n/a | n/a | 19 |
| 2023 | 3 | SGRICOL5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 16 |
| 2023 | 3 | SLOBSA25 | LARDVN\_LASCRU1\_1 | LARDVNTH | LASCRUCE | 16 |
| 2023 | 3 | SLOBSA25 | ASHERT\_CATARI1\_1 | CATARINA | ASHERTON | 15 |
| 2023 | 3 | MHARNED5 | HAINE\_\_LA\_PAL1\_1 | LA\_PALMA | HAINE\_DR | 15 |
| 2023 | 3 | SLOBSA25 | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 15 |
| 2023 | 3 | BASE CASE | VALEXP | n/a | n/a | 15 |
| 2023 | 3 | SW\_SBRN5 | 15010\_\_B | BLISS | ESTILES | 15 |
| 2023 | 3 | DSALKLN5 | 630\_\_B | KLNSW | HHSTH | 14 |
| 2023 | 3 | BASE CASE | MCCAMY | n/a | n/a | 14 |
| 2023 | 3 | DCOLFA59 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 13 |
| 2023 | 3 | SMADSAP8 | MADDUX\_SAPOWE2\_1 | MADDUX | SAPOWER | 12 |
| 2023 | 3 | MCONMDS5 | 6051\_\_A | QALSW | ODEHV | 12 |
| 2023 | 3 | DMGSBTR5 | 6036\_\_A | TKWSW | MGSES | 11 |
| 2023 | 3 | MCONLNG5 | 15010\_\_B | BLISS | ESTILES | 11 |
| 2023 | 3 | DCAGCI58 | BERGHE\_AT1H | BERGHE | BERGHE | 11 |
| 2023 | 3 | SCARFRI8 | ATSO\_SONR1\_1 | SONR | ATSO | 10 |
| 2023 | 3 | DMOLLO58 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 10 |
| 2023 | 3 | DMGSBIT5 | 6036\_\_A | TKWSW | MGSES | 10 |
| 2023 | 3 | SFORYEL8 | HEXT\_MASONS1\_1 | MASONSW | HEXT | 10 |
| 2023 | 3 | DBIGKEN5 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 10 |
| 2023 | 3 | DTWIDIV5 | REDCREEK\_T2L | REDCREEK | REDCREEK | 10 |
| 2023 | 3 | SFORYEL8 | HEXT\_MASONS1\_1 | HEXT | MASONSW | 10 |
| 2023 | 3 | XNED258 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 10 |
| 2023 | 3 | DBWNAMO5 | REDCREEK\_T2L | REDCREEK | REDCREEK | 9 |
| 2023 | 3 | SI\_DI\_38 | I\_DUPP\_I\_DUPS1\_1 | I\_DUPP1 | I\_DUPSW | 9 |
| 2023 | 3 | DCALBEC8 | E1\_R2\_1 | R2 | E1 | 8 |
| 2023 | 3 | SBIGTWI5 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 8 |
| 2023 | 3 | SWHILON5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 8 |
| 2023 | 3 | DJACALV8 | MYRA\_VAL\_1 | MYRA | VALYVIEW | 8 |
| 2023 | 3 | DELMSAN5 | PAWNEE\_SPRUCE\_1 | PAWNEE | CALAVERS | 8 |
| 2023 | 3 | XBLE58 | SAR\_FRAN\_1 | FRANKC | SARGNTS | 8 |
| 2023 | 3 | DGRSPKR5 | 6377\_\_A | BRTSW | ORANS | 8 |
| 2023 | 3 | SCMNCPS5 | 651\_\_B | CMNSW | CMNTP | 8 |
| 2023 | 3 | DKENCA58 | BERGHE\_AT1H | BERGHE | BERGHE | 8 |
| 2023 | 3 | MBOGTID8 | CO\_PL\_84\_A | PL | CO | 8 |
| 2023 | 3 | DELMSAN5 | PAWNEE\_SPRUCE\_1 | CALAVERS | PAWNEE | 8 |
| 2023 | 3 | MCONLNG5 | HARGRO\_TWINBU1\_1 | HARGROVE | TWINBU | 8 |
| 2023 | 3 | MCONLNG5 | HARGRO\_TWINBU1\_1 | TWINBU | HARGROVE | 8 |
| 2023 | 3 | DTWIDIV5 | 134T429\_1 | SAPOWER | SCHKAD | 8 |
| 2023 | 3 | DBIGKEN5 | ESCOND\_GANSO1\_1 | GANSO | ESCONDID | 8 |
| 2023 | 3 | DWHILON5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 8 |
| 2023 | 3 | DLWSRNK5 | 587\_\_A | ARGYL | LWSVH | 7 |
| 2023 | 3 | DMTSCOS5 | 6437\_\_F | SCRCV | KNAPP | 7 |
| 2023 | 3 | DSWETKW5 | 6036\_\_A | TKWSW | MGSES | 7 |
| 2023 | 3 | BASE CASE | JFSSC\_06\_A | JFS | SC | 7 |
| 2023 | 3 | BASE CASE | HHGTOM\_1 | HHGT | OMEGA | 7 |
| 2023 | 3 | MCONLNG5 | 6217\_\_A | WLVSW | GAILS | 7 |
| 2023 | 3 | DCAGCO58 | BERGHE\_AT1H | BERGHE | BERGHE | 7 |
| 2023 | 3 | SN\_SLON5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 7 |
| 2023 | 3 | SQALODE5 | 6059\_\_B | CONSW | MDSSW | 7 |
| 2023 | 3 | DCENRI35 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 7 |
| 2023 | 3 | DSWECBF5 | BLUF\_C\_MULBER1\_1 | MULBERRY | BLUF\_CRK | 6 |
| 2023 | 3 | SCENLOB5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 6 |
| 2023 | 3 | SLOBSA25 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 6 |
| 2023 | 3 | SBIGTWI5 | ESCOND\_GANSO1\_1 | GANSO | ESCONDID | 6 |
| 2023 | 3 | DSCOTKW5 | 15060\_\_B | VEALMOOR | KOCHTAP | 6 |
| 2023 | 3 | DCC1DUKE | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 6 |
| 2023 | 3 | DKOCNUE8 | MCKENZ\_WESTSI1\_1 | WESTSIDE | MCKENZIE | 6 |
| 2023 | 3 | SBONNED5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 6 |
| 2023 | 3 | SMV\_PAR8 | RIOHND\_ERIOHND\_1 | RIOHONDO | MV\_RIOHO | 5 |
| 2023 | 3 | SBE2ASH8 | TURTLECK\_WCRYS\_1 | WCRYSTS | TURTLCRK | 5 |
| 2023 | 3 | DCAGTA58 | H3\_K0\_1 | K0 | H3 | 5 |
| 2023 | 3 | SN\_SAJO5 | LASPUL\_RAYMND1\_1 | LASPULGA | RAYMND2 | 5 |
| 2023 | 3 | SMV\_PAR8 | RIOHND\_ERIOHND\_1 | MV\_RIOHO | RIOHONDO | 5 |
| 2023 | 3 | SBE2ASH8 | TURTLECK\_WCRYS\_1 | TURTLCRK | WCRYSTS | 5 |
| 2023 | 3 | SFORYEL8 | HEXT\_YELWJC1\_1 | YELWJCKT | HEXT | 5 |
| 2023 | 3 | DBIGKEN5 | TREADW\_YELWJC1\_1 | TREADWEL | YELWJCKT | 5 |
| 2023 | 3 | SW\_GODE5 | 15060\_\_B | VEALMOOR | KOCHTAP | 5 |
| 2023 | 3 | DLONOR58 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 5 |
| 2023 | 3 | DCENREV5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 5 |
| 2023 | 3 | DCAGCI58 | BERGHE\_AT1L | BERGHE | BERGHE | 5 |
| 2023 | 3 | XBGL88 | BISON\_STRS1\_1 | BISON | STRS | 5 |
| 2023 | 3 | SBRAUVA8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 5 |
| 2023 | 3 | XLOB258 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 4 |
| 2023 | 3 | DSCOTKW5 | 6215\_\_A | BCKSW | CGRSW | 4 |
| 2023 | 3 | DKENCA58 | BERGHE\_AT1L | BERGHE | BERGHE | 4 |
| 2023 | 3 | DBIGKEN5 | HAMILT\_MAXWEL1\_1 | MAXWELL | HAMILTON | 4 |
| 2023 | 3 | DAUSSND5 | SNDSW\_MR1H | SNDSW | SNDSW | 4 |
| 2023 | 3 | DBWNAMO5 | 134T429\_1 | SAPOWER | SCHKAD | 4 |
| 2023 | 3 | MMDSQAL5 | MDSSW\_MR1H | MDSSW | MDSSW | 4 |
| 2023 | 3 | SALAN\_28 | CELANE\_N\_SHAR1\_1 | N\_SHARPE | CELANEBI | 4 |
| 2023 | 3 | DTWIDIV5 | COKEST\_REDCRE1\_1 | REDCREEK | COKESTRE | 4 |
| 2023 | 3 | SBGLTWI8 | CONCHO\_SANW0\_1 | CONCHO | SANW | 4 |
| 2023 | 3 | STANPAW5 | BEEVIL\_NORMAN1\_1 | BEEVILLE | NORMANNA | 4 |
| 2023 | 3 | SVICCO28 | COLETO\_VICTOR2\_1 | COLETO | VICTORIA | 4 |
| 2023 | 3 | DSALHUT5 | 270\_\_A | KNBSW | TMPSW | 4 |
| 2023 | 3 | DCAGCO58 | BERGHE\_AT1L | BERGHE | BERGHE | 3 |
| 2023 | 3 | MCONQAL5 | 6471\_\_A | MGSES | MCDLD | 3 |
| 2023 | 3 | DWHILON5 | GRETA\_REFUGI1\_1 | REFUGIO | GRETA | 3 |
| 2023 | 3 | SLOBSA25 | FREER\_LOBO1\_1 | LOBO | FREER | 3 |
| 2023 | 3 | MMGSCON5 | HARGRO\_TWINBU1\_1 | HARGROVE | TWINBU | 3 |
| 2023 | 3 | SMDOOAS5 | MSNPET04\_A | PET | MSN | 3 |
| 2023 | 3 | DSTPANS5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 3 |
| 2023 | 3 | DWHILON5 | BEEVIL\_NORMAN1\_1 | NORMANNA | BEEVILLE | 3 |
| 2023 | 3 | SI\_DI\_48 | I\_DUPP\_I\_DUPS2\_1 | I\_DUPP1 | I\_DUPSW | 3 |
| 2023 | 3 | DYELHE89 | KATEMC\_MASN1\_1 | MASN | KATEMCY | 3 |
| 2023 | 3 | DTWIDIV5 | PALOUS\_WOLFCA1\_1 | PALOUSE | WOLFCAMP | 3 |
| 2023 | 3 | SOWLBIG8 | PHBL\_T\_STRS1\_1 | STRS | PHBL\_TAP | 3 |
| 2023 | 3 | DTWIDIV5 | SAPOWE\_SAST1\_1 | SAST | SAPOWER | 3 |
| 2023 | 3 | SCRMSAR8 | STMBOA\_WINT1\_1 | STMBOAT | WINT | 3 |
| 2023 | 3 | DCAGCI58 | 255T279\_1 | PIPECR | MEDILA | 3 |
| 2023 | 3 | MMGSCON5 | 6471\_\_A | MGSES | MCDLD | 3 |
| 2023 | 3 | DWO5\_EU8 | BI\_AT5 | BI | BI | 3 |
| 2023 | 3 | SBRACAL8 | D3\_G3\_1 | D3 | G3 | 3 |
| 2023 | 3 | SSPJFS8 | JFSSC\_06\_A | JFS | SC | 3 |
| 2023 | 3 | SFTWW\_D8 | WD\_RDWELLS\_1 | W\_DENT | RDWELLS | 3 |
| 2023 | 3 | DWHILON5 | BEEVIL\_NORMAN1\_1 | BEEVILLE | NORMANNA | 3 |
| 2023 | 3 | SLAQLOB8 | BRUNI\_69\_1 | BRUNI | BRUNI | 3 |
| 2023 | 3 | SCT2CAR8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 3 |
| 2023 | 3 | SHOLWES8 | HOLLY4\_SOUTH\_1\_1 | HOLLY4 | SOUTH\_SI | 3 |
| 2023 | 3 | SBIGTWI5 | TREADW\_YELWJC1\_1 | TREADWEL | YELWJCKT | 3 |
| 2023 | 3 | SBNBPK25 | 6005\_\_A | PKRSW | BNBSW | 3 |
| 2023 | 3 | DDILCOT8 | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 3 |
| 2023 | 3 | SN\_SAJO5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 3 |
| 2023 | 3 | SGRICOL5 | CALLIC\_LON\_HI1\_1 | LON\_HILL | CALLICOA | 3 |
| 2023 | 3 | SSCHTWI8 | CONCHO\_SANW0\_1 | CONCHO | SANW | 3 |
| 2023 | 3 | DVANCOR8 | DANEVA\_69\_1 | DANEVA | DANEVA | 3 |
| 2023 | 3 | MHARNED5 | LASPUL\_RAYMND1\_1 | LASPULGA | RAYMND2 | 3 |
| 2023 | 3 | SOWLBIG8 | BISON\_STRS1\_1 | BISON | STRS | 3 |
| 2023 | 3 | MMGSCON5 | HARGRO\_TWINBU1\_1 | TWINBU | HARGROVE | 3 |
| 2023 | 3 | DWHIGIB8 | LON\_HI\_WWKS\_T1\_1 | LON\_HILL | WWKS\_TAP | 3 |
| 2023 | 3 | DBRNSTR8 | F1\_O9\_1 | F1 | SUTHRLND | 3 |
| 2023 | 3 | DSCOTKW5 | 6217\_\_B | GAILS | KEYSB | 2 |
| 2023 | 3 | DCLEZOR5 | 89T204\_1 | ZORN | HENNE | 2 |
| 2023 | 3 | MCLEPEN5 | FARMLAND\_LONGD\_1 | FARMLAND | W\_LD\_345 | 2 |
| 2023 | 3 | SBIGTWI5 | GANSO\_MAVERI1\_1 | MAVERICK | GANSO | 2 |
| 2023 | 3 | SDOWMOO8 | UVLD\_DOWI\_1 | DOWNIES | UVLDES | 2 |
| 2023 | 3 | SDOWMOO8 | UVLD\_DOWI\_1 | UVLDES | DOWNIES | 2 |
| 2023 | 3 | SBAKCED5 | CROSSO\_PALOUS1\_1 | PALOUSE | CROSSOVE | 2 |
| 2023 | 3 | SGRICOL5 | GRETA\_REFUGI1\_1 | REFUGIO | GRETA | 2 |
| 2023 | 3 | SFTLMES8 | PALOUS\_WOLFCA1\_1 | PALOUSE | WOLFCAMP | 2 |
| 2023 | 3 | DCENFAL5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 2 |
| 2023 | 3 | DSWECCR5 | 6036\_\_A | TKWSW | MGSES | 2 |
| 2023 | 3 | DSCOTKW5 | 6217\_\_A | WLVSW | GAILS | 2 |
| 2023 | 3 | MHARNED5 | BURNS\_HEIDLBRG\_1 | MV\_BURNS | MV\_HBRG4 | 2 |
| 2023 | 3 | STANPAW5 | CALLIC\_LON\_HI1\_1 | LON\_HILL | CALLICOA | 2 |
| 2023 | 3 | SALIBNT8 | MYRA\_VAL\_1 | MYRA | VALYVIEW | 2 |
| 2023 | 3 | SLOBSA25 | NLARSW\_PILONC1\_1 | NLARSW | PILONCIL | 2 |
| 2023 | 3 | SBLESTP5 | BELLSO\_AT2 | BELLSO | BELLSO | 2 |
| 2023 | 3 | DBRNSTR8 | C3\_G3\_1 | G3 | C3 | 2 |
| 2023 | 3 | SSANFOW5 | CATARI\_PILONC1\_1 | CATARINA | PILONCIL | 2 |
| 2023 | 3 | DWHICOT5 | FARMLAND\_LONGD\_1 | FARMLAND | W\_LD\_345 | 2 |
| 2023 | 3 | SPOMNED5 | FREER\_LOBO1\_1 | LOBO | FREER | 2 |
| 2023 | 3 | SBIGOR45 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 2 |
| 2023 | 3 | DTVWSHR5 | 495\_\_B | TVWSW | VENSW | 2 |
| 2023 | 3 | MCONQAL5 | 6217\_\_A | WLVSW | GAILS | 2 |
| 2023 | 3 | SBENRAI8 | BENTS\_FRTER\_1C\_1 | RAILROAD | S\_MISSIN | 2 |
| 2023 | 3 | SN\_SLON5 | BONILL\_NEDIN1\_1 | BONILLA | NEDIN | 2 |
| 2023 | 3 | SNEDSTE5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 2 |
| 2023 | 3 | SNWEWES8 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 2 |
| 2023 | 3 | SILLFTL8 | CARVER\_TINSLE1\_1 | CARVER | TINSLEY | 2 |
| 2023 | 3 | SW\_SBRN5 | CRTVLE\_EINSTEN\_1 | EINSTEIN | CRTRVLLE | 2 |
| 2023 | 3 | DBWNAMO5 | HARGRO\_TWINBU1\_1 | TWINBU | HARGROVE | 2 |
| 2023 | 3 | SCARLVO8 | MADDUX\_SAPOWE1\_1 | MADDUX | SAPOWER | 2 |
| 2023 | 3 | SBTPBNT8 | MYRA\_VAL\_1 | MYRA | VALYVIEW | 2 |
| 2023 | 3 | SNADRIC8 | NAD\_ELCM\_1 | NADAS | ELCMPOS | 2 |
| 2023 | 3 | DRILKRW5 | OKLA\_RILEY2\_1 | RILEY | OKLA | 2 |
| 2023 | 3 | DLONOR58 | PANTER\_WESMER1\_1 | WESMER | PANTERA | 2 |
| 2023 | 3 | DTWIDIV5 | REDCREEK\_T2H | REDCREEK | REDCREEK | 2 |
| 2023 | 3 | SALIBNT8 | SPR\_VALY\_1 | VALYVIEW | SPR | 2 |
| 2023 | 3 | SBTPBNT8 | SPR\_VALY\_1 | VALYVIEW | SPR | 2 |
| 2023 | 3 | SBRACAL8 | F1\_O9\_1 | F1 | SUTHRLND | 2 |
| 2023 | 3 | SBRAHAM8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 2 |
| 2023 | 3 | SODLBRA8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 2 |
| 2023 | 3 | BASE CASE | N\_TO\_H | n/a | n/a | 2 |
| 2023 | 3 | DBWNAMO5 | SAPOWE\_SAST1\_1 | SAST | SAPOWER | 2 |
| 2023 | 3 | DRILKRW5 | 106\_\_B | ALLNC | RNKSW | 2 |
| 2023 | 3 | DHILWTH8 | 2390\_\_F | HIL | WTHRE | 2 |
| 2023 | 3 | DLEGOUT5 | 50\_\_A | BBSES | JEWET | 2 |
| 2023 | 3 | DCAGCO58 | 583T583\_1 | BANDER | MASOCR | 2 |
| 2023 | 3 | DBIGKEN5 | CARVER\_TINSLE1\_1 | CARVER | TINSLEY | 2 |
| 2023 | 3 | DBWNAMO5 | COKEST\_REDCRE1\_1 | REDCREEK | COKESTRE | 2 |
| 2023 | 3 | DBRNSTR8 | D3\_G3\_1 | D3 | G3 | 2 |
| 2023 | 3 | SN\_SLON5 | HAINE\_\_LA\_PAL1\_1 | LA\_PALMA | HAINE\_DR | 2 |
| 2023 | 3 | DTOKJK\_5 | 260\_A\_1 | JEWET | SNG | 2 |
| 2023 | 3 | DTVWJON5 | 6033\_\_A | CPSES | MBDSW | 2 |
| 2023 | 3 | SCOLBAL8 | BALLIN\_HUMBLT1\_1 | BALLINGE | HUMBLTAP | 2 |
| 2023 | 3 | DWHIGIB8 | CAL\_WW\_WWKS\_T1\_1 | WWKS\_TAP | CAL\_WWKS | 2 |
| 2023 | 3 | SCRMSAR8 | CONCHO\_VRBS1\_1 | CONCHO | VRBS | 2 |
| 2023 | 3 | STITSCA8 | LA\_PAL\_VCAVAZ1\_1 | LA\_PALMA | VCAVAZOS | 2 |
| 2023 | 3 | DCENRI25 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 2 |
| 2023 | 3 | BASE CASE | RANDAD\_ZAPATA1\_1 | RANDADO | ZAPATA | 2 |
| 2023 | 3 | SMTFCHA8 | 1210\_\_B | HUBRD | HAN1 | 1 |
| 2023 | 3 | DKRWLWS5 | 584\_\_A | KRMSW | ARGYL | 1 |
| 2023 | 3 | DCRLLSW5 | 589\_E\_1 | LWVTI | LWSVS | 1 |
| 2023 | 3 | DSCOTKW5 | 6095\_\_D | LMESA | JPPOI | 1 |
| 2023 | 3 | MTOMTEC5 | 6380\_\_D | PAINTCRE | MURRAY | 1 |
| 2023 | 3 | SCMNCPS5 | 651\_\_C | CMNTP | SHILO | 1 |
| 2023 | 3 | SSOLSGS8 | BARL\_HOEFSR1\_1 | BARL | HOEFSROA | 1 |
| 2023 | 3 | SWHILON5 | BEEVIL\_NORMAN1\_1 | BEEVILLE | NORMANNA | 1 |
| 2023 | 3 | SWHILON5 | BLESSI\_LOLITA1\_1 | BLESSING | LOLITA | 1 |
| 2023 | 3 | SCARLVO8 | CONCHO\_SANW0\_1 | CONCHO | SANW | 1 |
| 2023 | 3 | DDEESTR8 | D3\_G3\_1 | D3 | G3 | 1 |
| 2023 | 3 | DVANELT8 | DANEVA\_69\_1 | DANEVA | DANEVA | 1 |
| 2023 | 3 | DBIGKEN5 | GANSO\_MAVERI1\_1 | MAVERICK | GANSO | 1 |
| 2023 | 3 | DLONWEI8 | MCKENZ\_WESTSI1\_1 | MCKENZIE | WESTSIDE | 1 |
| 2023 | 3 | SBLESTP5 | SAR\_FRAN\_1 | FRANKC | SARGNTS | 1 |
| 2023 | 3 | SCARFRI8 | ATSO\_OZNC1\_1 | ATSO | OZNC | 1 |
| 2023 | 3 | SOWLBIG8 | BIGLAK\_PHBL\_T1\_1 | PHBL\_TAP | BIGLAKE | 1 |
| 2023 | 3 | DAJOSTE5 | CATARI\_PILONC1\_1 | CATARINA | PILONCIL | 1 |
| 2023 | 3 | MMGSCON5 | CONCHO\_SANW0\_1 | CONCHO | SANW | 1 |
| 2023 | 3 | SOAKOAK8 | CONCHO\_VRBS1\_1 | CONCHO | VRBS | 1 |
| 2023 | 3 | DTWIDIV5 | CRTVLE\_EINSTEN\_1 | EINSTEIN | CRTRVLLE | 1 |
| 2023 | 3 | MCONQAL5 | HARGRO\_PUMPJA1\_1 | HARGROVE | PUMPJACK | 1 |
| 2023 | 3 | DGILHIW8 | MAYO\_WHITE\_1\_1 | MAYO | WHITE\_PT | 1 |
| 2023 | 3 | BASE CASE | MGSES\_MR4H | MGSES | MGSES | 1 |
| 2023 | 3 | SNICBLU8 | NICOLE\_TENNYS1\_1 | NICOLE | TENNYSON | 1 |
| 2023 | 3 | XNED258 | PANTER\_WESMER1\_1 | WESMER | PANTERA | 1 |
| 2023 | 3 | SSANFOW5 | PAWNEE\_TANGO1\_1 | TANGO | PAWNEE | 1 |
| 2023 | 3 | DGILHIW8 | REACTOR1\_SEC\_1 | WHITE\_PT | WHITE\_PT | 1 |
| 2023 | 3 | DBWNAMO5 | REDCREEK\_T2H | REDCREEK | REDCREEK | 1 |
| 2023 | 3 | BASE CASE | SA\_TAP76\_1 | SA | SA | 1 |
| 2023 | 3 | DJEWSNG5 | SNGXGC75\_1 | GIBCRK | SNG | 1 |
| 2023 | 3 | SBE2ASH8 | WCR\_CARI\_1 | WCRYSTS | CARIZOS | 1 |
| 2023 | 3 | DKRWCDE5 | 105\_\_B | RNKSW | LWSSW | 1 |
| 2023 | 3 | DLONOR58 | 480T480\_1 | HARLNSW | N\_MERCED | 1 |
| 2023 | 3 | SABRSPR8 | 584\_\_A | KRMSW | ARGYL | 1 |
| 2023 | 3 | MMGSCON5 | 6095\_\_D | LMESA | JPPOI | 1 |
| 2023 | 3 | MCONQAL5 | 6217\_\_B | GAILS | KEYSB | 1 |
| 2023 | 3 | DEMSDEN8 | 6270\_\_D | HCKSW | WGROB | 1 |
| 2023 | 3 | SHPWJOY9 | 6626\_\_F | BTTSW | HENWE | 1 |
| 2023 | 3 | DCLEPA58 | ABNTHWST\_69T2 | ABNTHWST | ABNTHWST | 1 |
| 2023 | 3 | DDEESTR8 | C3\_F1\_1 | C3 | F1 | 1 |
| 2023 | 3 | BASE CASE | CFLATS\_TLINE\_1 | CFLATS | TREADWEL | 1 |
| 2023 | 3 | DBWNAMO5 | COKEST\_RUSTHI1\_1 | COKESTRE | RUSTHILL | 1 |
| 2023 | 3 | MBOGTID8 | CO\_WAS84\_A | CO | WAS | 1 |
| 2023 | 3 | SWRDYN8 | DA\_WC\_89\_A | WC | DA | 1 |
| 2023 | 3 | SN\_SLON5 | FALFUR\_KINGRN1\_1 | FALFUR | KINGRNCH | 1 |
| 2023 | 3 | DFPPLOS5 | FAYETT\_AT2H | FAYETT | FAYETT | 1 |
| 2023 | 3 | SBWDDBM5 | LPLNE\_LPLDB\_1 | LPLNE | LPLDB | 1 |
| 2023 | 3 | MCONMGS5 | MGSES\_MR4L | MGSES | MGSES | 1 |
| 2023 | 3 | DSTPANS5 | NORMAN\_PETTUS1\_1 | PETTUS | NORMANNA | 1 |
| 2023 | 3 | DWHILON5 | NORMAN\_PETTUS1\_1 | PETTUS | NORMANNA | 1 |
| 2023 | 3 | DCC1DUKE | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 1 |
| 2023 | 3 | SFREFAY8 | BELLSO\_AT2 | BELLSO | BELLSO | 1 |
| 2023 | 3 | STANPAW5 | BULLMO\_CALLIC1\_1 | CALLICOA | BULLMOOS | 1 |
| 2023 | 3 | DHJWFCK5 | DA\_WC\_89\_A | WC | DA | 1 |
| 2023 | 3 | SCT2CAR8 | ESCOND\_GANSO1\_1 | GANSO | ESCONDID | 1 |
| 2023 | 3 | SODLBRA8 | GANSO\_MAVERI1\_1 | GANSO | MAVERICK | 1 |
| 2023 | 3 | DGILHIW8 | GILA\_MAYO1\_1 | GILA | MAYO | 1 |
| 2023 | 3 | MHARRIO5 | HAINE\_\_LA\_PAL1\_1 | LA\_PALMA | HAINE\_DR | 1 |
| 2023 | 3 | SSCLWF28 | OLN\_FMR2 | OLN | OLN | 1 |
| 2023 | 3 | SVANRAY8 | RAYBURN\_69\_2 | RAYBURN | RAYBURN | 1 |
| 2023 | 3 | DLARAN89 | SCARBI\_TITAN\_1\_1 | SCARBIDE | TITAN\_SU | 1 |
| 2023 | 3 | SSTILOM8 | SCARBI\_TITAN\_1\_1 | SCARBIDE | TITAN\_SU | 1 |
| 2023 | 3 | SVCAMIL8 | SCARBI\_TITAN\_1\_1 | SCARBIDE | TITAN\_SU | 1 |
| 2023 | 3 | SDIMBEV8 | UVALDE\_W\_BATE1\_1 | W\_BATESV | UVALDE | 1 |
| 2023 | 3 | MMGSCON5 | 6144\_\_A | BSPRW | STASW | 1 |
| 2023 | 3 | SRICGRS8 | 6840\_\_B | NVKSW | ANARN | 1 |
| 2023 | 3 | DSTPANS5 | BLESSI\_PALACI1\_1 | BLESSING | PALACIOS | 1 |
| 2023 | 3 | SNEDLON5 | BURNS\_HEIDLBRG\_1 | MV\_BURNS | MV\_HBRG4 | 1 |
| 2023 | 3 | MHARRIO5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 1 |
| 2023 | 3 | SNE2NED8 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 1 |
| 2023 | 3 | SVEAW\_L5 | CEDRHI\_SILT1\_1 | CEDRHILL | SILT | 1 |
| 2023 | 3 | DTWIDIV5 | COKEST\_RUSTHI1\_1 | COKESTRE | RUSTHILL | 1 |
| 2023 | 3 | SCARFRI8 | FDR\_OZNC\_1 | FRIEND\_R | OZNC | 1 |
| 2023 | 3 | SDUKNED8 | HEC\_NEDIN2\_1 | HEC | NEDIN | 1 |
| 2023 | 3 | STRECFL8 | MADDUX\_SAPOWE1\_1 | MADDUX | SAPOWER | 1 |
| 2023 | 3 | MGIRTNW8 | M\_69\_N1\_1 | TNPINION | TNFS | 1 |
| 2023 | 3 | MGIRTNW8 | PUC\_NNAT\_1 | NRTH | PUCKETT | 1 |
| 2023 | 3 | SRINWHI8 | WHITE\_PT\_69A1 | WHITE\_PT | WHITE\_PT | 1 |
| 2023 | 3 | DKENCA58 | 255T279\_1 | PIPECR | MEDILA | 1 |
| 2023 | 3 | DCAGCI58 | 460T460\_1 | MEDILA | W1 | 1 |
| 2023 | 3 | MCONLNG5 | 6095\_\_D | LMESA | JPPOI | 1 |
| 2023 | 3 | BASE CASE | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 1 |
| 2023 | 3 | DCENREV5 | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 1 |
| 2023 | 3 | MASHDIL8 | ASHERT\_CATARI1\_1 | ASHERTON | CATARINA | 1 |
| 2023 | 3 | DSTPANS5 | BEEVIL\_NORMAN1\_1 | BEEVILLE | NORMANNA | 1 |
| 2023 | 3 | DVANEDN8 | BELLSO\_AT2 | BELLSO | BELLSO | 1 |
| 2023 | 3 | XBLE58 | BELLSO\_AT2 | BELLSO | BELLSO | 1 |
| 2023 | 3 | DSTPANS5 | BLESSI\_LOLITA1\_1 | BLESSING | LOLITA | 1 |
| 2023 | 3 | SWHILON5 | BLESSI\_PALACI1\_1 | BLESSING | PALACIOS | 1 |
| 2023 | 3 | BASE CASE | BOARDCRK\_T3 | BOARDCRK | BOARDCRK | 1 |
| 2023 | 3 | SLOBSA25 | BRUNI\_69\_1 | BRUNI | BRUNI | 1 |
| 2023 | 3 | BASE CASE | CATARI\_PILONC1\_1 | CATARINA | PILONCIL | 1 |
| 2023 | 3 | DDILCOT8 | CATARI\_PILONC1\_1 | CATARINA | PILONCIL | 1 |
| 2023 | 3 | SCISPUT8 | ESTES\_PECAN\_1\_1 | PECAN\_BY | ESTES | 1 |
| 2023 | 3 | SVANRAY8 | FOR\_INEZ\_1 | FORTRSW | INEZS | 1 |
| 2023 | 3 | SBIGOR45 | GANSO\_MAVERI1\_1 | MAVERICK | GANSO | 1 |
| 2023 | 3 | DTWIDIV5 | HARGRO\_TWINBU1\_1 | TWINBU | HARGROVE | 1 |
| 2023 | 3 | SI\_2RES8 | I\_DUPS\_MCCAMP2\_1 | I\_DUPSW | MCCAMPBE | 1 |
| 2023 | 3 | DBLBYWF5 | JCKREF27\_A | REF | JCK | 1 |
| 2023 | 3 | DJEWSNG5 | JK\_TOKSW\_1 | TOKSW | JK\_CK | 1 |
| 2023 | 3 | SDBMFID5 | LPLHY\_LPLDB\_1 | LPLDB | LPLHY | 1 |
| 2023 | 3 | SBRAUVA8 | MAXWEL\_WHITIN1\_1 | MAXWELL | WHITING | 1 |
| 2023 | 3 | DLONWEI8 | MCKENZ\_WESTSI1\_1 | WESTSIDE | MCKENZIE | 1 |
| 2023 | 3 | MCONMGS5 | MGSES\_MR4H | MGSES | MGSES | 1 |
| 2023 | 3 | MCLEPEN5 | MULBER\_PERIGE1\_1 | PERIGEE | MULBERRY | 1 |
| 2023 | 3 | SNICBLU8 | NICOLE\_TENNYS1\_1 | TENNYSON | NICOLE | 1 |
| 2023 | 3 | SVCAMIL8 | PALOAL\_TITAN\_1\_1 | TITAN\_SU | PALOALTO | 1 |
| 2023 | 3 | DGIBZEN5 | SNGXGC75\_1 | GIBCRK | SNG | 1 |
| 2023 | 3 | DFL\_MAR8 | STLTB\_66\_A | TB | STL | 1 |
| 2023 | 3 | XCMN58 | STMBOA\_WINT1\_1 | STMBOAT | WINT | 1 |
| 2023 | 3 | DANACDE5 | 105\_\_B | RNKSW | LWSSW | 1 |
| 2023 | 3 | DSCOTKW5 | 15060\_\_A | KOCHTAP | BUZSW | 1 |
| 2023 | 3 | DTVWJON5 | 153\_\_A | RKCRK | TVWSW | 1 |
| 2023 | 3 | XNED258 | 480T480\_1 | HARLNSW | N\_MERCED | 1 |
| 2023 | 3 | DNAVOUT5 | 50\_\_A | BBSES | JEWET | 1 |
| 2023 | 3 | SBAKNOR5 | 6095\_\_D | LMESA | JPPOI | 1 |
| 2023 | 3 | DBWNAMO5 | BIGLAK\_RUSSEK1\_1 | BIGLAKE | RUSSEKST | 1 |
| 2023 | 3 | DVICDUP8 | GREENL\_WEAVER1\_1 | WEAVERRD | GREENLK | 1 |
| 2023 | 3 | MHARNED5 | HAINE\_\_OLEAND1\_1 | HAINE\_DR | OLEANDER | 1 |
| 2023 | 3 | SFTWW\_D8 | LOCUST\_NODE\_1 | LOCUST\_D | DMENODE | 1 |
| 2023 | 3 | SALAN\_28 | N\_SHARPE\_PS3 | N\_SHARPE | N\_SHARPE | 1 |
| 2023 | 3 | DLARAN89 | PALOAL\_TITAN\_1\_1 | TITAN\_SU | PALOALTO | 1 |
| 2023 | 3 | DBWNAMO5 | PALOUS\_WOLFCA1\_1 | PALOUSE | WOLFCAMP | 1 |
| 2023 | 3 | SNEDLON5 | PANTER\_WESMER1\_1 | WESMER | PANTERA | 1 |
| 2023 | 3 | SI\_DWH38 | RINCON\_WHITE\_2\_1 | RINCON | WHITE\_PT | 1 |
| 2023 | 3 | DFPPHOL5 | 190T152\_1 | WINCHES | GIDEON | 1 |
| 2023 | 3 | SBONNED5 | 480T480\_1 | HARLNSW | N\_MERCED | 1 |
| 2023 | 3 | SHENPAI8 | ABNTHWST\_69T2 | ABNTHWST | ABNTHWST | 1 |
| 2023 | 3 | SGRICOL5 | BULLMO\_CALLIC1\_1 | CALLICOA | BULLMOOS | 1 |
| 2023 | 3 | SNEDLON5 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 1 |
| 2023 | 3 | DWPWFWP5 | DA\_WC\_89\_A | WC | DA | 1 |
| 2023 | 3 | SRAYRI28 | HAINE\_\_LA\_PAL1\_1 | LA\_PALMA | HAINE\_DR | 1 |
| 2023 | 3 | SRAYRI38 | HAINE\_\_LA\_PAL1\_1 | LA\_PALMA | HAINE\_DR | 1 |
| 2023 | 3 | BASE CASE | KINGNW\_KNGWTAP\_1 | KNGWTAP | KING\_NW | 1 |
| 2023 | 3 | MCONLNG5 | MGSES\_MR4H | MGSES | MGSES | 1 |
| 2023 | 3 | SVANRAY8 | NUR\_FORT\_1 | NURSRYS | FORTRSW | 1 |
| 2023 | 3 | SCTLCMN5 | STMBOA\_WINT1\_1 | STMBOAT | WINT | 1 |
| 2023 | 3 | MCLEPEN5 | VERN\_69T1 | VERN | VERN | 1 |
| 2023 | 3 | SPOCTE28 | WD\_RDWELLS\_1 | W\_DENT | RDWELLS | 1 |
| 2023 | 3 | DWLDSCO5 | 15060\_\_B | VEALMOOR | KOCHTAP | 1 |
| 2023 | 3 | MMGSCON5 | 6217\_\_A | WLVSW | GAILS | 1 |
| 2023 | 3 | SHOCHOC8 | AM\_AM\_26\_1 | AM | AM | 1 |

1. Current Wind Generation Record: 27,044 MW on 05/29/2022 at 22:36 | Current Wind Penetration Record: 69.15% on 04/10/2022 at 01:43

 Current Solar Generation Record: 11,937 MW on 03/25/2023 at 14:25| Current Solar Penetration Record: 29.77% on 03/04/2023 at 11:19 [↑](#footnote-ref-1)
2. This is the hourly integrated peak demand as published in the ERCOT D&E report. [↑](#footnote-ref-2)
3. All DC Tie Curtailments are posted publicly on the ERCOT Market Information System. See that posting for additional details for the event(s) in question. [↑](#footnote-ref-3)
4. See DC Tie Operating Procedure (<http://www.ercot.com/mktrules/guides/procedures>) for more details. [↑](#footnote-ref-4)