



## Outage History

The table below provides a list of outages that have occurred on PSCo transmission lines in the study area over the last two years.

Ckt ID	Circuit Name	Outage Date/Time	Restore Date/Time	Duration	SGS Category
3015	Collbran-Grand Junction 138kV	4/5/06 13:03	4/6/06 18:30	1 days 05 hours 27 minutes	3 (Lines)
5205	RiflePS-Parachute 230kV	3/30/06 18:43	3/30/06 18:45	0 days 00 hours 02 minutes	2 (System Protection)
5205	RiflePS-Parachute 230kV	5/3/06 19:09	5/3/06 19:12	0 days 00 hours 03 minutes	2 (System Protection)
5205	RiflePS-Parachute 230kV	7/6/07 17:08	7/6/07 22:04	0 days 04 hours 56 minutes	10 (Excludable)
5205	RiflePS-Parachute 230kV	8/8/07 7:31	8/8/07 7:31	0 days 00 hours 00 minutes	2 (System Protection)
5509	Parachute-Cameo 230kV	3/22/06 23:43	3/22/06 23:47	0 days 00 hours 04 minutes	2 (System Protection)
5509	Parachute-Cameo 230kV	5/3/06 19:09	5/3/06 19:12	0 days 00 hours 03 minutes	5 (Lightning Only)
5509	Parachute-Cameo 230kV	5/31/06 1:29	5/31/06 1:35	0 days 00 hours 06 minutes	2 (System Protection)
5509	Parachute-Cameo 230kV	7/9/06 20:28	7/9/06 20:32	0 days 00 hours 04 minutes	9 (Other)
5509	Parachute-Cameo 230kV	1/7/08 14:58	1/7/08 15:06	0 days 00 hours 08 minutes	9 (Other)
5555	Uintah-Grand JunctionCu 230kV	1/6/08 3:59	1/8/08 15:25	2 days 11 hours 26 minutes	3 (Lines)
5555	Uintah-Grand JunctionCu 230kV	2/15/08 2:00	2/15/08 2:13	0 days 00 hours 13 minutes	3 (Lines)
5557	Grand JunctionCu-GrandJunction 230kV	3/5/07 14:29	3/5/07 15:44	0 days 01 hours 15 minutes	10 (Excludable)
5557	Grand JunctionCu-GrandJunction 230kV	1/6/08 3:59	1/6/08 4:04	0 days 00 hours 05 minutes	2 (System Protection)
5557	Grand JunctionCu-GrandJunction 230kV	2/15/08 2:00	2/15/08 2:01	0 days 00 hours 01 minutes	2 (System Protection)
5607	Cameo-Uintah 230kV	6/6/07 7:42	6/6/07 7:46	0 days 00 hours 04 minutes	4 (Weather-not lightning)
5607	Cameo-Uintah 230kV	10/22/07 3:26	10/22/07 7:34	0 days 04 hours 08 minutes	2 (System Protection)
5607	Cameo-Uintah 230kV	1/6/08 4:03	1/6/08 4:20	0 days 00 hours 17 minutes	2 (System Protection)
6670	RifleCu-Cameo 69kV	2/15/06 13:18	2/15/06 13:19	0 days 00 hours 01 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	3/28/06 20:21	3/28/06 21:39	0 days 01 hours 18 minutes	3 (Lines)
6670	RifleCu-Cameo 69kV	4/17/06 12:41	4/17/06 12:43	0 days 00 hours 02 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	4/17/06 14:01	4/17/06 14:03	0 days 00 hours 02 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	4/17/06 14:08	4/17/06 16:10	0 days 02 hours 02 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	4/17/06 16:20	4/17/06 16:20	0 days 00 hours 00 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	6/22/06 9:59	6/22/06 10:02	0 days 00 hours 03 minutes	8 (External)
6670	RifleCu-Cameo 69kV	7/6/06 10:08	7/6/06 11:11	0 days 01 hours 03 minutes	1 (Equipment)
6670	RifleCu-Cameo 69kV	7/23/06 21:27	7/24/06 1:36	0 days 04 hours 09 minutes	5 (Lightning Only)
6670	RifleCu-Cameo 69kV	8/2/06 17:27	8/2/06 17:27	0 days 00 hours 00 minutes	6 (Unknown)
6670	RifleCu-Cameo 69kV	10/7/06 10:35	10/9/06 14:35	2 days 04 hours 00 minutes	3 (Lines)
6670	RifleCu-Cameo 69kV	2/11/07 4:40	2/11/07 4:40	0 days 00 hours 00 minutes	1 (Equipment)
6670	RifleCu-Cameo 69kV	2/11/07 5:32	2/11/07 5:32	0 days 00 hours 00 minutes	1 (Equipment)
6670	RifleCu-Cameo 69kV	4/21/07 11:20	4/21/07 12:47	0 days 01 hours 27 minutes	10 (Excludable)
6670	RifleCu-Cameo 69kV	5/3/07 14:22	5/3/07 14:23	0 days 00 hours 01 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	6/6/07 7:55	6/6/07 7:57	0 days 00 hours 02 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	6/9/07 16:12	6/9/07 16:13	0 days 00 hours 01 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	7/5/07 16:05	7/5/07 16:05	0 days 00 hours 00 minutes	5 (Lightning Only)
6670	RifleCu-Cameo 69kV	8/20/07 18:43	8/20/07 18:47	0 days 00 hours 04 minutes	6 (Unknown)



6670	RifleCu-Cameo 69kV	9/12/07 7:25	9/12/07 7:30	0 days 00 hours 05 minutes	1 (Equipment)
6670	RifleCu-Cameo 69kV	9/14/07 22:34	9/14/07 22:34	0 days 00 hours 00 minutes	5 (Lightning Only)
6670	RifleCu-Cameo 69kV	10/20/07 17:29	10/20/07 17:30	0 days 00 hours 01 minutes	3 (Lines)
6670	RifleCu-Cameo 69kV	10/20/07 17:31	10/21/07 19:04	1 days 01 hours 33 minutes	3 (Lines)
6670	RifleCu-Cameo 69kV	11/30/07 16:50	12/3/07 13:05	2 days 20 hours 15 minutes	4 (Weather-not lightning)
6670	RifleCu-Cameo 69kV	12/8/07 12:42	12/8/07 12:43	0 days 00 hours 01 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	2/13/06 8:16	2/13/06 8:16	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	3/12/06 6:01	3/12/06 6:02	0 days 00 hours 01 minutes	4 (Weather-not lightning)
7300	Craig-RifleCu 345kV	10/22/06 7:28	10/22/06 7:28	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	11/20/06 22:56	11/20/06 22:56	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	12/15/06 7:46	12/15/06 7:46	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	12/17/06 7:05	12/17/06 7:05	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	1/6/07 2:51	1/6/07 2:51	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	1/16/07 4:25	1/16/07 4:25	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	1/25/07 20:33	1/25/07 20:34	0 days 00 hours 01 minutes	9 (Other)
7300	Craig-RifleCu 345kV	1/26/07 3:18	1/26/07 3:19	0 days 00 hours 01 minutes	9 (Other)
7300	Craig-RifleCu 345kV	2/18/07 8:14	2/18/07 8:14	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	4/22/07 1:37	4/22/07 1:39	0 days 00 hours 02 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	7/20/07 16:20	7/20/07 16:20	0 days 00 hours 00 minutes	5 (Lightning Only)
7300	Craig-RifleCu 345kV	9/16/07 22:21	9/16/07 22:33	0 days 00 hours 12 minutes	4 (Weather-not lightning)
7300	Craig-RifleCu 345kV	9/22/07 9:33	9/22/07 9:33	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	9/26/07 2:17	9/26/07 2:17	0 days 00 hours 00 minutes	6 (Unknown)
7300	Craig-RifleCu 345kV	10/20/07 7:01	10/20/07 7:02	0 days 00 hours 01 minutes	4 (Weather-not lightning)
7300	Craig-RifleCu 345kV	12/9/07 3:41	12/9/07 3:43	0 days 00 hours 02 minutes	6 (Unknown)
7302	RifleCu-Grand JunctionCu 345kV	3/22/06 23:43	3/22/06 23:46	0 days 00 hours 03 minutes	6 (Unknown)
7302	RifleCu-Grand JunctionCu 345kV	5/3/06 8:44	5/3/06 8:44	0 days 00 hours 00 minutes	6 (Unknown)
7302	RifleCu-Grand JunctionCu 345kV	5/31/06 1:29	5/31/06 1:29	0 days 00 hours 00 minutes	6 (Unknown)
7302	RifleCu-Grand JunctionCu 345kV	7/9/06 20:28	7/9/06 20:28	0 days 00 hours 00 minutes	5 (Lightning Only)

Note: The following are the SGS Statistical Services Cause Code Categories

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1. Equipment: Terminal Equipment Failure. Transmission circuit outages caused by failures of breakers, switches, transformers, capacitor banks, busses etc. Any “inside the fence” initiating causes related to equipment failure (exclusive of system protection) should be assigned to this category.
2. System Protection: System Protection or Relay Equipment Failure, misoperation, incorrect settings or scheme, “over-reaching”, communications, etc. Include relay misoperations, but where the cause of misoperation is unknown.
3. Lines: Line Equipment Failure. Transmission circuit outages caused by failed hardware “outside the fence”: Structures, conductors, cable, cable hardware, insulators, static wire, foundation, etc. Some systems include wind, lightning and ice conditions or galloping causing failures that were within design specifications.
4. Weather, other than lightning: Severe weather conditions, usually beyond the design capabilities of the facilities, resulting in outages, exclusively of lightning.
5. Lightning Only: Verified or suspected outages resulting from lightning, ideally when the magnitude of the stroke is verified to exceed design capabilities.
6. Unknown: Diligent attempts to verify cause were unsuccessful. Do not include outages where a failed component or system has been identified, but the source of the failure is unknown (see Category 2: System Protection, above).

7. Vegetation: Vegetation and trees that directly cause an outage. Do not include vegetation incidents that originate off the ROW and not subject to removal under good utility practice.
8. External: Outage causes external to, and outside the control of the transmission system. Examples include foreign utilities, customer equipment, generation, instability or under-frequency, distribution through-faults, vegetation that is not on the ROW and not subject to removal under good utility practices, wildlife or public damage/interference (where reasonable protective measures were in place or not possible) etc.
9. Other: None of the above. Some of these may include operating or workmanship errors, contractor errors, dig-ins, loggers and instances of wildlife or public damage/interference where protective measures were or should have been in place but failed, contamination, etc.
10. Excludable Outages: An excludable outage for a limited number of events or circumstances:
  - a) Operational Outage for individual events that are required for safety, voltage control, or stability and initiated by supervisory control.
  - b) System Disturbances for events associated with cascading (the initiating event and secondary events should be included with appropriated cause description).
  - c) Major Catastrophic Events are the most extreme circumstances a transmission system encounters and should be judiciously limited to “once in ten years” events or situations where reasonable response plans are impossible. Some examples of such occurrences include – Hurricane Andrew (1992), Hurricane Katrina (2005), the NY-Ontario-Quebec ice storm (1998), and California wildfires (2003). Instances of the second (or more) hurricane in a short interval of time (e.g. Florida in 2004).

Category 10 Major Catastrophic Events either impacted many circuits (e.g. >25% of system or region total) in a short time period or a limited number of circuits for an extended period (outage duration measured in weeks as opposed to hours or days). In a few cases, Category 10 may be applied to individual outages such as the destruction of a river crossing or extreme snow depth requiring the forced outage of a line because of insufficient conductor-to-ground clearance.

These outages are removed from screening computations and from system-level summaries. *Use this designation sparingly.* We may question any system that allocates more than 1% of total outages into this category and may request re-assignment of root cause if the designation is used inappropriately. The five-year (2002-2006) average for outages designated Category 10 outages was 2.18% of all outages (comprising 28% of total duration). By far the largest numbers of “excludables” were hurricane or ice storm related.