

# 2005 - Disturbance Index - Public

Date	Region	Utilities	Type	MW	Customers	Cause
18-Jan-05	MAPP-Canada	MHEB	UO	0	0	SPS Misoperation
29-Jan-05	SERC-Southern	SOCO	INT	100	150,000	Weather - Winter Storm - Severe
08-Mar-05	SERC	CPL	INT	0	51600	Weather - Wind Storm - Severe
08-Mar-05	WECC-NWPP	PACW	UO	0	0	Sys. Prot. - Unknown
17-Mar-05	NPCC-ISO-NE	ISNE	INT	0	0	Equipment Failure
02-Apr-05	WECC-RMPA	PACW	INT	0	0	Off-Normal Operation - Equipment Overload
20-Apr-05	WECC-CAMX	SMUD	INT	200	48,000	Human Error
21-Apr-05	WECC-CAMX	SMUD	INT	168	48,000	Human Error
22-Apr-05	WECC-CAMX	SMUD	INT	127	69,979	SPS Misoperation - RTU Malfunction
30-Apr-05	SERC-Southern	SOCO	INT	100	51,808	Weather - Thunderstorm - Severe
08-May-05	ERCOT	ERCO	INT	672	243,000	Weather - Thunderstorm - Severe
19-May-05	WECC-NWPP	BPAT	INT	0	0	Weather - Lightning
19-May-05	WECC-NWPP	BPAT	INT	0	0	Weather - Lightning
25-May-05	NPCC-HQ	HQT	UO	0	0	Sys. Prot. - Unknown
27-May-05	NPCC-Ontario	IESO	INT	2300	N/A	Human Error
29-May-05	ERCOT	ERCO	INT	N/A	123,000	Weather - Thunderstorm - Severe
30-May-05	WECC-CAMX	CFE	INT	52.9	N/A	Sys. Prot. - Unknown
31-May-05	WECC-NWPP	BPAT	INT	0	0	Weather - Lightning
01-Jun-05	WECC-NWPP	BPAT	INT	0	0	Equipment Failure - Damage Insulators
02-Jun-05	NPCC-Quebec	HQT	INT	1,500	415,000	Fires - Forrest Fires
06-Jun-05	NPCC-HQ	HQT	UO	0	0	Weather - Lightning - Severe
07-Jun-05	NPCC-Maritimes	NBPwr	INT	14	2	Weather - Lightning Storm
13-Jun-05	NPCC-Quebec	HQT	UO	0	0	Equipment Failure
14-Jun-05	NPCC-Quebec	HQT	UO	0	0	SPS Misoperation - Telecommunications Failure
15-Jun-05	SPP	EES	INT	1,100	150,000	Weather - High Winds
19-Jun-05	MAPP-Canada	MHEB	INT	N/A	15,000	Weather - Tornado
21-Jun-05	WECC-NWPP	BPAT	UO	0	0	Weather - Lightning
21-Jun-05	WECC-NWPP	SCL	UO	0	0	Weather - Lightning
21-Jun-05	WECC-NWPP	AESO	INT	200	N/A	Weather - Lightning and Winds - Severe

Date	Region	Utilities	Type	MW	Customers	Cause
23-Jun-05	NPCC-Quebec	HQT	UO	0	0	Human Error - Unknown
24-Jun-05	MAIN	CE	INT	N/A	51,500	Equipment Failure
28-Jun-05	WECC-RMPA	PSCO	UO	0	0	Fuel Supply Problems
01-Jul-05	ERCOT	ERCO	INT	100	N/A	Sys. Prot. - Unknown
09-Jul-05	WECC-RMPA	PACE	Int	150	18,600	Equipment Failure
10-Jul-05	SERC-Southern	SOCO	INT	N/A	66,830	Weather - Hurricane Denis
10-Jul-05	SERC	AEC	INT	N/A	50,000	Weather - Hurricane Dennis
11-Jul-05	NPCC-Quebec	HQT	UO	0	0	Equipment Failure
17-Jul-05	NPCC-Quebec	HQT	UO	1173	361,166	Human Error
19-Jul-05	WECC-NWPP	BPAT	UO	0	0	Human Error
19-Jul-05	NPCC-Quebec	HQT	UO	0	0	Weather - Lightning
28-Jul-05	SERC	DUK	INT	N/A	52,200	Weather - Thunderstorm - Severe
01-Aug-05	NPCC-Quebec	HQT	UO	0	0	Weather - Lightning
09-Aug-05	NPCC-Quebec	HQT	UO	0	0	Weather - Lghtning Storm - Severe
25-Aug-05	WECC-CAMX	LDWP	INT	1,700	N/A	Equipment Failure
26-Aug-05	FRCC	HST	INT	38	17,500	Weather - Hurricane Katrina
29-Aug-05	SPP	LGEE	INT	300	143000	Weather - Hurricane Katrina
29-Aug-05	SERC	CLEC	INT	380	50,800	Weather - Hurricane Katrina
29-Aug-05	SERC-Southern	SOCO	INT	8,972	897,257	Weather - Hurricane Katrina
10-Sep-05	WECC-NWPP	AESO	UO	8	8,000	Weather - Snow and High Wnds
12-Sep-05	WECC-CAMX	BURB	INT	172	50,686	Human Error
12-Sep-05	WECC-CAMX	LDWP	INT	2,200	N/A	Human Error
12-Sep-05	WECC-CAMX	GLEN	INT	130	63,000	Human Error
13-Sep-05	MAIN	WEC	INT	600	110,000	Weather - Winds - Severe
14-Sep-05	SERC	CPLE	INT	215	60,000	Weather - Hurricane Ophelia
20-Sep-05	WECC-NWPP	BCTC	UO	0	0	Weather - Lightning
21-Sep-05	WECC-NWPP	BCTC	UO	0	0	Human Error
22-Sep-05	FRCC	PEF	PA	0	0	Public Appeal
23-Sep-05	SERC	LAGN	INT	350	125,000	Weather - Hurricane Rita
23-Sep-05	ERCOT	ERCO	INT	N/A	715,000	Weather - Hurricane Rita
23-Sep-05	SERC-Entergy	EES	INT	N/A	787,774	Weather - Hurricane Rita
24-Sep-05	ERCOT	ERCO	INT	N/A	100,000	Weather - Hurricane Rita
24-Sep-05	SERC	CLEC	INT	N/A	80,000	Weather - Hurricane Rita
23-Oct-05	FRCC	FPL	INT	10,000	3,200,000	Weather - Hurricane Wilma
24-Oct-05	FRCC	HST	INT	33	17,500	Weather - Hurricane Wilma
25-Oct-05	NPCC-ISO-NE	ISNE	UO	0	0	Equipment Failure

<b>Date</b>	<b>Region</b>	<b>Utilities</b>	<b>Type</b>	<b>MW</b>	<b>Customers</b>	<b>Cause</b>
02-Nov-05	WECC-NWPP	BCTC	INT	350	2,700	Weather - Lightning
25-Nov-05	WECC-NWPP	AESO	INT	375	N/A	Weather - Snow, Heavy Wet, and Freezing Rain
15-Dec-05	SERC	DUK	INT	3000	600,000	Weather - Ice Storm
15-Dec-05	SERC-Southern	SOCO	INT	75	52,659	Weather - Ice storm
15-Dec-05	SERC	GSOC	INT	200	52,000	Weather - Ice storm
18-Dec-05	WECC-CAMX	CISO	INT	N/A	60,000	Weather - Rain and High Winds
31-Dec-05	WECC-CAMX	CISO	INT	800	1,667,316	Weather - Rain and High Winds

## 2005 - Number of Disturbances by Region - Public

Region	Disturbances
ERCOT	5
FRCC	4
MAIN	2
MAPP-Canada	2
NPCC-HQ	2
NPCC-ISO-NE	2
NPCC-Maritimes	1
NPCC-Ontario	1
NPCC-Quebec	9
SERC	9
SERC-Entergy	1
SERC-Southern	5
SPP	2
WECC-CAMX	10
WECC-NWPP	14
WECC-RMPA	3
<b>Total Number of Disturbances:</b>	<b>72</b>

## 2005 - Disturbance Reports - Public

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**Region:** MAPP

**Control Area ID:** MHEB

**Date - Time:** 1/18/2005 1:25:00 PM CST

**Year:** 2005    **Type:** UO

**Utility:** MHEB, Transmission Services

**Category:** SPS Misoperation

**Cause:** SPS Misoperation

**Event Description:**

On January 18, 2005 at 1325 and again at 1333 CDT, a special protection scheme caused the reduction of 331 MW of area generation after receiving a false signal due to faulty microwave equipment. The faulty module has been replaced. This incident did not cause any loss of customer load.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** SOCO

**Date - Time:** 1/29/2005 10:00:00 AM CST

**Year:** 2005    **Type:** INT

**Utility:** Southern Company Services, Inc.

**Category:** Weather

**Cause:** Weather - Winter Storm - Severe

**Event Description:**

On January 29, 2005 at 1000, a severe winter storm caused widespread distribution outages in parts of Alabama and Georgia. Approximately 150,000 electric service customers were affected by this storm.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** CPLE

**Date - Time:** 3/8/2005 11:00:00 AM EST

**Year:** 2005    **Type:** INT

**Utility:** Carolina Power & Light Company - CPLE

**Category:** Weather

**Cause:** Weather - Wind Storm - Severe

**Event Description:**

On March 8, 2005 at 1100 EST, a severe wind storm caused widespread outages in Eastern and Central North Carolina. Approximately 51,600 electric customers were interrupted. All customer load was restored by 0600 EST on March 9, 2005.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** PACW

**Date - Time:** 3/8/2005 3:55:00 PM PST

**Year:** 2005 **Type:** UO

**Utility:** PacifiCorp-West

**Category:** Sys. Prot.

**Cause:** Sys. Prot. - Unknown

**Event Description:**

On March 8, 2005 at 15:55 PST, system protection removed a high voltage transmission line from service. The cause of the fault is unknown. Because of the loss of this transmission line, a special protection scheme was initiated that resulted in 1055 MW of generation being dropped at various hydroelectric generating stations, and a dynamic braking resistor was inserted to prevent excessive power flows on other facilities. There was no interruption to any electric customer load. By 1723, all facilities had been restored to service.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC

**Control Area ID:** ISNE

**Date - Time:** 3/17/2005 8:02:00 PM EST

**Year:** 2005    **Type:** INT

**Utility:** ISO New England Inc.

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On March 17, 2005 at 2002 EST, system protection removed from service a high voltage transmission line due to a failed splice. A second high voltage transmission line was already out of service for planned maintenance. A contingency analysis indicated possible overloads might occur on lower voltage transmission lines. The utility re-dispatched area generation to prevent any overloads. There was no interruption to any electric service customers because of this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** PACW

**Date - Time:** 4/2/2005 12:11:00 PM MST

**Year:** 2005    **Type:** INT

**Utility:** PacifiCorp-West

**Category:** Off-Normal Operation

**Cause:** Off-Normal Operation - Equipment Overload

**Event Description:**

On April 2, 2005 at 1211 MST, system protection removed from service a high voltage transmission line due to an overloading condition. Prior to the outage, another higher voltage transmission line was removed from service for scheduled maintenance. Area generation had been reduced to allow for the scheduled maintain outage. In addition, the high voltage step-down transformers at one substation became overloaded. A second high voltage transmission line was manually removed from service to relieve the loading on these transformers. Area voltages remained within normal limits. There were no other overloaded facilities because of this incident. There was no loss of electric customer load or generation. The transmission system was normal by 1616 MST.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** SMUD

**Date - Time:** 4/20/2005 2:08:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Sacramento Municipal Utility District

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On April 20, 2005 at 1408 PDT, during routine switching to restore two high voltage step-down transformers to service, a switchman inadvertently opened the wrong switch, which caused unbalanced flows across the switch and the arc to ground triggered system protection to remove from service two other high voltage step-down transformers. This resulted in the loss of approximately 200 MW of firm customer load. About 48,000 electric customers were interrupted as a result of this incident. By 1506 PDT, all electric service had been restored.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** SMUD

**Date - Time:** 4/21/2005 9:29:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Sacramento Municipal Utility District

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On April 21, 2005 at 2129 PDT, while a crew was removing its personal grounds during routine switching to restore a high voltage switch that had been damaged the previous day, it made contact with an energized potential transformer (PT). This caused the activation of the system protection, which removed from service two high voltage step-down transformers. This resulted in the loss of approximately 168 MW of firm customer load. About 48,000 electric customers were interrupted as a result of this incident. By 2155 PDT, all electric service had been restored.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** SMUD

**Date - Time:** 4/22/2005 2:14:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Sacramento Municipal Utility District

**Category:** SPS Misoperation

**Cause:** SPS Misoperation - RTU Malfunction

**Event Description:**

On April 22, 2005 at 1414 PDT, a substation remote terminal unit (RTU) malfunctioned. Because of this malfunction, about 127 MW of firm load and approximately 69,979 electric customers were interrupted when multiple high voltage transmission lines and three high voltage step-down transformers were opened ended at the substation involved. By 1425, all firm loads were restored to the electric customers interrupted. By 1434, all transmission facilities were normal. The local RTU was disabled until repairs were completed.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** SOCO

**Date - Time:** 4/30/2005 8:00:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** Southern Company Services, Inc.

**Category:** Weather

**Cause:** Weather - Thunderstorm - Severe

**Event Description:**

On 4/30/2005 at 0800 CDT, a severe thunder storm moved through the area causing the loss of electric service to about 51,800 eclectic customers.

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## 2005 - Disturbance Reports - Public

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**Region:** ERCOT

**Control Area ID:** ERCO

**Date - Time:** 5/8/2005 3:00:00 PM CDT

**Year:** 2005 **Type:** INT

**Utility:** ERCOT ISO

**Category:** Weather

**Cause:** Weather - Thunderstorm - Severe

**Event Description:**

On May 8, 2005 at about 15:00 CDT, a series of strong thunderstorms moved across a utilities service territory causing widespread distribution outages. At the peak of these storms, about 243,000 customers had their electric services interrupted. By about 1700 on May 10, 2005 CDT, all customer electric service had been restored.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 5/19/2005 8:07:00 AM PDT

**Year:** 2005 **Type:** INT

**Utility:** Bonneville Power Administration Transmission

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On May 19, 2005 at 0807 PDT, system protection momentarily removed from service a high voltage transmission line due to a possible lightning strike. Because of this event, a special protection scheme activated as designed. Remedial actions that occurred included local generation dropping of 1,683 MW of generation, and other remedial actions designed to prevent localized low voltages on the AC transmission system. No interruptible or firm load was shed because of this event. The transmission system was stabilized and normal within nine minutes.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 5/19/2005 1:47:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Bonneville Power Administration Transmission

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On May 19, 2005 at 1347 PDT, system protection momentarily removed from service a high voltage transmission line due to a possible lightning strike. Because of this event, a special protection scheme activated as designed. Remedial actions that occurred included local generation dropping of 966 MW of generation, and other remedial actions designed to prevent localized low voltages on the AC transmission system. No interruptible or firm load was shed because of this event. The transmission system was stabilized and normal within twelve minutes.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 5/25/2005 2:17:00 PM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Sys. Prot.

**Cause:** Sys. Prot. - Unknown

**Event Description:**

On May 25, 2005 at 1417 EDT, system protection, inadvertently, removed from service a high voltage transmission line. This caused the initiation of the special protection scheme to remove from service 1130 MW of generation at a local generating plant because of the loss of the high voltage transmission.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-Ontario

**Control Area ID:** IESO

**Date - Time:** 5/27/2005 3:15:00 PM EST

**Year:** 2005    **Type:** INT

**Utility:** Independent Electric System Operator

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On May 27, 2005 at 1515 EST, system protection removed from service several high voltage transmission lines when operating personnel closed a high voltage circuit breaker during routine switching to restore a high voltage bus after maintenance. Operating personnel failed to recognize that grounds that had been applied to the high voltage bus had not been removed.

Because of this incident, approximately 2,300 MW of firm customer load was shed. In addition, approximately 750 MW of local generation was removed from service due to low station service voltage that occurred as the firm load was rapidly being restored. The transmission system and generating units were restored by 16:20 EST. All electric customer load was restored within about 60 minutes from the initial incident

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## 2005 - Disturbance Reports - Public

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**Region:** ERCOT

**Control Area ID:** ERCO

**Date - Time:** 5/29/2005 8:00:00 PM CDT

**Year:** 2004    **Type:** INT

**Utility:** ERCOT ISO

**Category:** Weather

**Cause:** Weather - Thunderstorm - Severe

**Event Description:**

On May 29, 2005 at about 20:00 CDT, a strong thunderstorm caused widespread distribution outages throughout a utilities service area. At the peak of the storm, about 123,000 electric customers were interrupted. By May 31, 2005 at 17:00 CDT, all electric customers had been restored.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** CFE

**Date - Time:** 5/30/2005 1:54:00 PM PDT

**Year:** 2005 **Type:** INT

**Utility:** Comision Federal de Electricidad

**Category:** Sys. Prot.

**Cause:** Sys. Prot. - Unknown

**Event Description:**

On May 30, 2005 at 1354 PDT, system protection removed from service three high voltage transmission lines due to a fault at a transmission substation. The cause of the fault is unknown. Because of this incident, a total of 333 MW of local generations was also removed from service. In addition, 52.9 MW of firm electric customer load was interrupted. By 1417 PDT, all firm electric customer load was restored.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 5/31/2005 4:09:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Bonneville Power Administration Transmission

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On May 31, 2005 at 1609 PDT, system protection removed from service a high voltage transmission line due to a lightning strike. This incident initiated a special protection scheme requiring 1,887 MW of area generation to be dropped. Upon line inspection, a parted insulator string was found that was damaged by the lightning strike. Repairs to the transmission line were completed on June 1, 2005. The area generation was restored by 1621 PDT. There was no interruption to firm electric customer load because of this incident. The special protection scheme responded properly.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 6/1/2005 1:36:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Bonneville Power Administration Transmission

**Category:** Equipment Failure

**Cause:** Equipment Failure - Damage Insulators

**Event Description:**

On June 1, 2005 at 1336 PDT, system protection removed from service a high voltage transmission line due to damaged insulators. The cause of the insulator damage is unknown. Because of this incident, a special protection scheme initiated various remedial actions. Remedial actions include the removal of shunt reactors, generation dropping of 426 MW, and opening a Direct Current tie line. There was no loss of firm electric customer load because of this incident. Local generation was restored by 1340 PDT. The high voltage transmission line was returned to service on June 2, 2005 after making repairs.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 6/2/2005 1:10:00 PM EDT

**Year:** 2005    **Type:** INT

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Fires

**Cause:** Fires - Forrest Fires

**Event Description:**

At 1310 EDT on June 2, 2005, a sequence of events caused by adverse climatic conditions, thunder storms and severe forest fires, caused a special protection scheme to operator after system protection removed from service three high voltage parallel transmission lines into a generation complex. Because of these events, 2,100 MW of generation was rejected by a special protection scheme. About 1,500 MW of firm customer load was shed during this event that caused the interruption to the electric service of about 415,000 customers.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 6/6/2005 12:07:00 PM EST

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Weather

**Cause:** Weather - Lightning - Severe

**Event Description:**

On June 6, 2005 at 1207 EST, system protection removed from service a high voltage transmission line because of a lightning strike. Because of the incident, a special protection scheme initiated to reject 750 MW of local generation. There was no firm load loss because of this incident. System conditions were normal by 1208.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-Maritimes

**Control Area ID:** NBPwr

**Date - Time:** 6/7/2005 6:01:00 PM AST

**Year:** 2005 **Type:** INT

**Utility:** New Brunswick Power Co.

**Category:** Weather

**Cause:** Weather - Lightning Storm

**Event Description:**

On June 7, 2005 at 1801 AST, system protection removed from service a high voltage transmission line because of a lightning strike that damaged an insulator and caused one phase to part. Because of this incident, a control circuit activated to remove a high voltage dc tie-line from service. The dc circuit was exporting 255 MW to an adjacent region. Local generation was reduced due to the loss of the dc circuit. In addition, about 14 MW of interruptible load at two industrial customers was shed because of the resulting voltage dip in the area. All interruptible loads was restored by 1900 on June 7, 2005. Repairs to the high voltage transmission line were completed by 1334 on June 8, 2005.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 6/13/2005 10:04:00 AM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On June 13, 2005 at 1004 EDT, system protection removed from service a high voltage transformer and two HVDC converters following a breaker failure operation. Because of this incident there was an interruption to 630 MW of export from the utility into a neighboring system. There was no loss of generation or firm customer electric service because of this incident. By 1240 EDT, the two HVFC converted had been restored. There was no explanation as to why the breaker failure occurred.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 6/14/2005 2:15:00 PM EST

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** SPS Misoperation

**Cause:** SPS Misoperation - Telecommunications  
Failure

**Event Description:**

On June 14, 2005 at 1415 EST, a special protection scheme initiated, causing 710 MW of local generation to be shed due to a telecommunications problem. There was no loss of customer electric load because of this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** EES

**Date - Time:** 6/15/2005 6:55:00 PM CDT

**Year:** 2005    **Type:** INT

**Utility:** Entergy

**Category:** Weather

**Cause:** Weather - High Winds

**Event Description:**

On June 15, 2005 at 1855 CDT, a severe storm with high winds caused multiple transmission line outages. In addition, three local generating units were removed from service by system protection due to the loss of the transmission lines. This incident cause electric service interruptions to about 1,100 MW of firm load serving about 150,000 customers. All electric customer load was restored by 2330 CDT.

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## 2005 - Disturbance Reports - Public

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**Region:** MAPP

**Control Area ID:** MHEB

**Date - Time:** 6/19/2005 7:10:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** MHEB, Transmission Services

**Category:** Weather

**Cause:** Weather - Tornado

**Event Description:**

Strong winds caused two 230 kV lines to trip which correctly initiated a special protection system running back the HVDC by 346 MW. Problems occurred with the reset of one bipole reset when the runback was complete causing it to continue ramping down until it was stopped at a 275 MW power order. This resulted in an additional 950 MW HVDC capacity loss. The inadvertent additional runback caused three lines at the rectifier end of the HVDC to overload and subsequently trip. The tripping of these lines and coincident loss of a valve group caused another 700 MW reduction in the HVDC generation.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 6/21/2005 10:04:00 AM PDT

**Year:** 2005    **Type:** UO

**Utility:** Bonneville Power Administration Transmission

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On June 21, 2005 at 1004 PDT, system protection removed from service a high voltage transmission line due to a lightning strike. This incident initiated a special protection scheme that removed from service 980 MW of area generation. At 1005, the high voltage transmission line was returned to service and at 1013, area generation was restored. There was no loss of firm load or electric service customers because of this incident. The special protection scheme operated properly.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** SCL

**Date - Time:** 6/21/2005 8:02:00 PM PDT

**Year:** 2005    **Type:** UO

**Utility:** Seattle City Light

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On June 21, 2005 at 2002 PDT, system protection removed from service two high voltage transmission lines due to a lightning strike. Both transmission lines auto reclosed properly. This caused a special protection scheme to remove from service 766 MW of area generation. At 2022 PDT, all area generation was restored. The special protection scheme operated properly. There was no firm demand or electric service customers lost because of this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** AESO

**Date - Time:** 6/21/2005 10:45:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Alberta Electric System Operator

**Category:** Weather

**Cause:** Weather - Lightning and Winds - Severe

**Event Description:**

On June 21, 2005 at 22:45 PDT, system protection removed from service several high voltage transmission lines as a severe wind and lightning storm passed through a utility's service area. Heavy rain, large hail and tornado velocity winds were associated with this storm. Preliminary reports indicate that about 200 transmission structures sustained damage, along with some damage at local substations. Because of this incident, about 200 MW of electric customer load was lost. Much of this load was industrial. There was no indication of the total number of electric customers involved, or when restoration would be completed. The local utility was still assessing damages at the time of this report.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 6/23/2005 1:18:00 AM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Human Error

**Cause:** Human Error - Unknown

**Event Description:**

On June 23, 2005 at 0118 EDT, a 670 MW generating unit was removed from service by unit automatics during switching operations. Cause of the incident is unknown. At 0123, the unit was restored to service.

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## 2005 - Disturbance Reports - Public

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**Region:** MAIN

**Control Area ID:** CE

**Date - Time:** 6/24/2005 8:37:00 PM CDT

**Year:** 2005 **Type:** INT

**Utility:** Commonwealth Edison

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On June 24, 2005 at 2037 CDT, system protection removed from service two high voltage underground transmission cables due to a fault. Because of the cable fault, the cable casing ruptured causing the insulating oil to ignite. Because of the fire, several other high voltage transmission lines were deenergized for safety while firefighters attempted to extinguish the fire. These underground transmission cables run in a common tunnel. Because of the transmission line outages, a single 340 MW local generating unit was removed from service. This incident caused the loss of about 51,500 electric service customers. All customer load was restored by 2306 CDT.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-RMPA

**Control Area ID:** PSCO

**Date - Time:** 6/28/2005 12:45:00 PM MDT

**Year:** 2005    **Type:** UO

**Utility:** Public Service Company of Colorado

**Category:** Fuel Supply Problems

**Cause:** Fuel Supply Problems

**Event Description:**

On June 28, 2005 at 1245 MDT, a utility company reported an interruption to one of its coal rail transportation systems at a local coal-fired generating station. The utility redispached area gas-fired generation to meet its demands adequately. There was no public appeal to conserve power issued because of this incident. There was no loss of firm load to any electric customer due to this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** ERCOT

**Control Area ID:** ERCO

**Date - Time:** 7/1/2005 1:13:00 PM CDT

**Year:** 2005    **Type:** INT

**Utility:** ERCOT ISO

**Category:** Sys. Prot.

**Cause:** Sys. Prot. - Unknown

**Event Description:**

On July 1, 2005 at 1313 CDT, system protection removed from service a high voltage step-down autotransformer when the overload relay actuated. Because the autotransformer configuration does not include high-side circuit breakers two associated high voltage transmission lines were also removed from service. Because of this incident the low side voltage dropped to about 0.9 p.u. An associated low-side bus was then removed from service and the low-side voltage dropped to 0.816 p.u before firm load shedding began. About 100 MW of firm customer load was shed.

At 1530 CDT, system protection removed another high voltage circuit breaker by overcurrent. The loss of this circuit breaker caused a special protection scheme to shed about 174 MW of interruptible loads. By 1634 CDT, the utility had all firm and interruptible loads restored. The total number of electric customers involved in this incident is unknown.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** PACE

**Date - Time:** 7/9/2005 10:21:00 AM MDT

**Year:** 2005    **Type:** Int

**Utility:** PacifiCorp-East

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On July 9, 2005 at 1021 MDT, system protection removed from service a high voltage transmission bus and several high voltage transmission lines due to a breaker failure operation on a circuit breaker to a station capacitor bank. Because of this incident about 150 MW of firm electric customer load, and about 69 MW of interruptible customer load was interrupted. About 18,600 electric customers were interrupted. In addition, 20 MW of customer owned local generation was removed from service. By 1128 MDT, all firm electric customer load, and the interruptible loads were restored.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** SOCO

**Date - Time:** 7/10/2005 8:00:00 AM EDT

**Year:** 2005    **Type:** INT

**Utility:** Southern Company Services, Inc.

**Category:** Weather

**Cause:** Weather - Hurricane Denis

**Event Description:**

On July 10, 2005 starting at about 0800, Hurricane Dennis moved through the Florida, Mississippi, Alabama and Georgia areas causing wide-spread electric customer outages. The peak total of electric customers that were without power occurred at 0800 on July 11, 2005 when about 570,899 customers were without power.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** AEC

**Date - Time:** 7/10/2005 12:53:00 PM EDT

**Year:** 2005    **Type:** INT

**Utility:** Alabama Electric Cooperative, Inc.

**Category:** Weather

**Cause:** Weather - Hurricane Dennis

**Event Description:**

On July 10, 2005 at about 12:53 EDT, Hurricane Dennis caused widespread distribution outages throughout the Southwestern parts of Alabama, and the western panhandle area of Florida. Approximately 50,000 electric customers were interrupted as a result of the high winds and damage to the distribution system.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 7/11/2005 3:33:00 PM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On July 11, 2005 at 1533 EDT, system protection removed from service a high voltage transmission line due to the failure of a series capacitor. Because of the loss of this transmission line, a special protection scheme initiated generation rejection of 750 MW at a local area power plant. System protection and the SPS operations were considered normal. There were no electric customer interruptions due to this incident. The system was returned to normal by 1537.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 7/17/2005 1:16:00 PM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On July 17, 2005 at 13:16 EDT, system protection removed from service two high voltage transmission lines during routine testing of system protection relays. At the time of the incident a third high voltage transmission line was already out of service for voltage control. Because of the loss of three transmission lines about 2,600 MW of area generation was dropped at various generating stations. This caused a drop in the system frequency to a low of 58,41 Hz, which then initiated underfrequency relays. About 1,173 MW of firm electric customer loads were interrupted due to the underfrequency relaying. About 361,166 electric customers were interrupted because of this incident. At 13:44 EDT, two of the high voltage transmission lines were returned to service. By 14:00 EDT, all firm electric customer loads were restored. The cause of this incident will be investigated further.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BPAT

**Date - Time:** 7/19/2005 12:50:00 PM PDT

**Year:** 2005    **Type:** UO

**Utility:** Bonneville Power Administration Transmission

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On July 19, 2005 at 12:50 PDT, a special protection scheme initiated a trip signal that caused about 1,440 MW of area generation to be removed from service. In addition, the special protection scheme also inserted a braking resistor as part of a remedial action scheme that would occur with the loss of a high voltage transmission line. The keying of the line loss signal was inadvertent. There was no transmission line outage. There was no loss of electric customer load, or any other problems noted. By 1306, all area generation had returned to service.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 7/19/2005 2:06:00 PM EDT

**Year:** 2005    **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On July 19, 2005 at 14:06 EDT, system protection removed from service two high voltage transmission lines due to a lightning strike. Because of this incident about 930 MW of area generation was dropped. Although the system frequency dropped to 59.33 Hz, no underfrequency load shedding occurred. There was no loss of electric service to any firm customer loads. By 1551 EDT, all generating units, and the transmission lines had been restored to service.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** DUK

**Date - Time:** 7/28/2005 8:30:00 PM EDT

**Year:** 2005    **Type:** INT

**Utility:** Duke Energy Corporation

**Category:** Weather

**Cause:** Weather - Thunderstorm - Severe

**Event Description:**

On July 28, 2005 starting at about 2030 EDT, a series of strong thunderstorms passed through a utilities service area causing widespread distribution outages. About 52,200 electric customers were interrupted. Repairs were completed and all electric customer loads were restored by 1700 on 8/1/2005.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 8/1/2005 11:07:00 PM EDT

**Year:** 2005 **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On August 1, 2005 at 2307 EDT, system protection removed from service two high voltage transmission lines due to a lightning strike. Because of this incident, about 887 MW of area generation was removed from service. There was no interruption to any firm or non-firm electric customer load.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC-HQ

**Control Area ID:** HQT

**Date - Time:** 8/9/2005 5:36:00 PM EDT

**Year:** 2005 **Type:** UO

**Utility:** Hydro-Quebec, TransEnergie

**Category:** Weather

**Cause:** Weather - Lghtning Storm - Severe

**Event Description:**

On August 9, 2005 at 1736 EDT, system protection removed from service a high voltage transmission line due to a lightning strike. Because of this line outage, a special protection scheme initiated the removal of 930 MW of area generation. There was no interruption to any electric customer loads because of this incident. All system protection and the special protection scheme functioned as designed. By 1749, the transmission line and all area generation had been returned to service.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** LDWP

**Date - Time:** 8/25/2005 3:47:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Los Angeles Department of Water and Power

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On August 25, 2005 at 1547 PDT, system protection removed from service one pole of a high voltage DC transmission line due to the loss of one converter. This caused an automatic reduction in the dc line's power order. In addition, a special protection scheme initiated various remedial actions including: insertion of series capacitor banks along a high voltage AC transmission path. At 1550, a transmission emergency was declared on one of the high voltage AC transmission paths in an adjacent system. At 1551, area utilities were ordered to shed non-firm interruptible loads to reduce the flow across the overloaded transmission path. At 1551, the high voltage dc transmission line began ramping to zero to terminate the ground return operation of the dc line. This caused increased power flows in the AC transmission paths, and a decline in system frequency. At 1553, the special protection scheme initiated additional remedial actions that resulted in dropping about 2249 MW of area generation. Because of declining system frequency, about 224 MW of firm electric customer load was shed. An additional 1,000 MW of load shedding was requested to stop the frequency decline. About 1,700 MW of both non-firm and firm electric customer load was dropped. At about 1608, system frequency was stable and load restoration began. By 1705, all non-firm, and firm electric customer loads were restored. The cause of the converter failure is not known. A further investigation will take place.

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## 2005 - Disturbance Reports - Public

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**Region:** FRCC

**Control Area ID:** HST

**Date - Time:** 8/26/2005 2:10:00 AM EDT

**Year:** 2005    **Type:** INT

**Utility:** City of Homestead

**Category:** Weather

**Cause:** Weather - Hurricane Katrina

**Event Description:**

On August 26, 2005 at 0210 EDT, system protection removed from service two high voltage transmission lines from service due to high winds associated with Hurricane Katrina on the eastern shore of Florida. This resulted in the loss of about 75% of the electric customers within the service area. By 1500, the transmission lines had been restored and the majority of the electric customers' services restored. Clean up was hampered by strong winds and flooding in the area,

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## 2005 - Disturbance Reports - Public

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**Region:** ECAR

**Control Area ID:** LGEE

**Date - Time:** 8/29/2005 1:10:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** LG&E Energy Transmission Services

**Category:** Weather

**Cause:** Weather - Hurricane Katrina

**Event Description:**

On August 29, 2005 at about 0710 CDT, Hurricane Katrina started causing widespread outages throughout the Gulf shore area.

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## 2005 - Disturbance Reports - Public

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**Region:** SPP

**Control Area ID:** CLEC

**Date - Time:** 8/29/2005 6:45:00 AM CDT

**Year:** 2005 **Type:** INT

**Utility:** Cleco Power LLC

**Category:** Weather

**Cause:** Weather - Hurricane Katrina

**Event Description:**

On August 29, 2005 at about 0645, Hurricane Katrina caused widespread damage and electric customer outages. Estimated that 50,800 electric customers were without electricity.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** SOCO

**Date - Time:** 8/29/2005 7:10:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** Southern Company Services, Inc.

**Category:** Weather

**Cause:** Weather - Hurricane Katrina

**Event Description:**

On August 29, 2005 at about 0710 CDT, Hurricane Katrina started causing widespread outages throughout the Gulf shore area.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** AESO

**Date - Time:** 9/10/2005 9:46:00 PM PDT

**Year:** 2005    **Type:** UO

**Utility:** Alberta Electric System Operator

**Category:** Weather

**Cause:** Weather - Snow and High Wnds

**Event Description:**

On September 10, 2005 at 2146 PDT, system protection removed from service a high voltage transmission line due to high winds and wet snow. Before this incident occurred, two lower voltage transmission lines had been removed from service due to the same storm. With the loss of the transmission line at 2146, the system separated from the Western Interconnection. AT 2218, the high voltage transmission line was returned to service. There was 8 MW of firm electric customer load lost as a result of the loss of the two lower voltage transmission lines. This affected about 8,000 electric customers.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** BURB

**Date - Time:** 9/12/2005 PDT

**Year:** 2005 **Type:** INT

**Utility:** Burbank Water & Power

**Category:** Human Error

**Cause:** Human Error

### Event Description:

On September 12, 2005 at 12:32 PDT, system protection removed from service two high voltage transmission buses at a central substation because of a problem with the secondary relay wiring on a break back up scheme. This either open-ended or removed from service several high voltage transmission lines. Subsequently, this caused automatic underfrequency load shedding. In addition, this caused the need for additional manual load shedding. About 2,200 MW of electric customer load was shed among several area utilities. At the same time, about 691 MW of local area generation was removed from service. The reason for the loss of this generation is under investigation.

Firm load was shed because the main transmission grid operates in a loop configuration, with only a few ties across the loop. Opening the loop caused large power flows across one portion of the transmission system that caused circuit overloads and low voltage in the area. Additional manual load shedding was needed in a effort to increase area voltages and reduce transmission line overloading.

At the time of this incident, maintenance personnel were moving a relay panel and may have incorrectly wired a portion of the system protection, or cut into secondary wiring of the relay circuits.

By 1556 PDT, system operators had all firm electric customer loads restored. There will be a further investigation into this incident by the utilities involved, and the regional reliability council

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** GLEN

**Date - Time:** 9/12/2005 12:32:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** City of Glendale

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On September 12, 2005 at 12:32 PDT, system protection removed from service two high voltage transmission buses at a central substation because of a problem with the secondary relay wiring on a break back up scheme. This either open-ended or removed from service several high voltage transmission lines. Subsequently, this caused automatic underfrequency load shedding. In addition, this caused the need for additional manual load shedding. About 2,200 MW of electric customer load was shed among several area utilities. At the same time, about 691 MW of local area generation was removed from service. The reason for the loss of this generation is under investigation.

Firm load was shed because the main transmission grid operates in a loop configuration, with only a few ties across the loop. Opening the loop caused large power flows across one portion of the transmission system that caused circuit overloads and low voltage in the area. Additional manual load shedding was needed in a effort to increase area voltages and reduce transmission line overloading.

At the time of this incident, maintenance personnel were moving a relay panel and may have incorrectly wired a portion of the system protection, or cut into secondary wiring of the relay circuits.

By 1417 PDT, system operators had all firm electric customer loads restored. There will be a further investigation into this incident by the utilities involved, and the regional reliability council.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** LDWP

**Date - Time:** 9/12/2005 12:32:00 PM PDT

**Year:** 2005    **Type:** INT

**Utility:** Los Angeles Department of Water and Power

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On September 12, 2005 at 12:32 PDT, system protection removed from service two high voltage transmission buses at a central substation because of a problem with the secondary relay wiring on a break back up scheme. This either open-ended or removed from service several high voltage transmission lines. Subsequently, this caused automatic underfrequency load shedding. In addition, this caused the need for additional manual load shedding. About 2,200 MW of electric customer load was shed among several area utilities. At the same time, about 691 MW of local area generation was removed from service. The reason for the loss of this generation is under investigation.

Firm load was shed because the main transmission grid operates in a loop configuration, with only a few ties across the loop. Opening the loop caused large power flows across one portion of the transmission system that caused circuit overloads and low voltage in the area. Additional manual load shedding was needed in a effort to increase area voltages and reduce transmission line overloading.

At the time of this incident, maintenance personnel were moving a relay panel and may have incorrectly wired a portion of the system protection, or cut into secondary wiring of the relay circuits.

By 1356 PDT, system operators had all firm electric customer loads restored. There will be a further investigation into this incident by the utilities involved, and the regional reliability council

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## 2005 - Disturbance Reports - Public

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**Region:** MAIN

**Control Area ID:** WEC

**Date - Time:** 9/13/2005 6:30:00 PM CDT

**Year:** 2005    **Type:** INT

**Utility:** Wisconsin Energy Corporation

**Category:** Weather

**Cause:** Weather - Winds - Severe

**Event Description:**

On September 13, 2005 at about 1800 CDT, a strong cold front with high winds moved through the services territory of a utility that caused widespread electric customer outages. The cold front brought sustained winds of over 60 MPH for the duration of the storm. This caused extensive damage to the distribution system. About 110,000 electric customers lost power during the storm. Repairs will take several days to complete.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** CPLE

**Date - Time:** 9/14/2005 3:00:00 PM EDT

**Year:** 2005    **Type:** INT

**Utility:** Carolina Power & Light Company - CPLE

**Category:** Weather

**Cause:** Weather - Hurricane Ophelia

**Event Description:**

On September 14, 2005 at 15:00 high winds from Hurricane Ophelia caused widespread outages within the distribution system of a utility in eastern North Carolina.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BCTC

**Date - Time:** 9/20/2005 3:51:00 PM PDT

**Year:** 2005    **Type:** UO

**Utility:** British Columbia Transmission Company

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On September 20, 2005 at 1551 PDT, system protection momentarily removed from service a high voltage transmission line due to a lightning strike. The transmission line successfully auto-reclosed. At the time of this incident, another high voltage transmission line was out of service for routine maintenance. Because of the momentary loss of the transmission line, a special protection scheme initiated shedding 950 MW of area generation. There was no loss of firm electric customer load because of this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BCTC

**Date - Time:** 9/21/2005 8:33:00 AM PDT

**Year:** 2005    **Type:** UO

**Utility:** British Columbia Transmission Company

**Category:** Human Error

**Cause:** Human Error

**Event Description:**

On September 21, 2005 at 0833 PDT, a high voltage transmission line was inadvertently tripped by operator error during routine switching. At the time of this error, another high voltage transmission line was already out of service for planned maintenance. Because of this incident, a special protection scheme removed from service another high voltage transmission line as part of an islanding scheme. This resulted in a portion of the utility's service area to become islanded from the Interconnection. The island also included an adjacent system. When the islanding occurred, the adjacent system's frequency went to about 60,64 Hz. Because of the high frequency condition about 291 MW of area generation was tripped on over-frequency protection. By 0852, the transmission system had been restored, and the islanded area was reconnected to the Interconnection. There was no firm electric customer load lost because of this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** FRCC

**Control Area ID:** PEF

**Date - Time:** 9/22/2005 12:00:00 PM EDT

**Year:** 2005    **Type:** PA

**Utility:** Progress Energy - Florida

**Category:** Public Appeal

**Cause:** Public Appeal

**Event Description:**

On September 22, 2005 at 12:00 EDT, a public appeal for electric customers to temporarily reduce their use of electricity began. This public appeal was in effect until Sunday September 25, 2005 because of Hurricane Rita's probable affect on area fuel supplies in the Gulf of Mexico, Texas, and Florida.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** LAGN

**Date - Time:** 9/23/2005 1:06:00 PM CDT

**Year:** 2005 **Type:** INT

**Utility:** Louisiana Generating, LLC

**Category:** Weather

**Cause:** Weather - Hurricane Rita

**Event Description:**

On September 23, 2005 at about 1306 CDT, strong winds associated with Hurricane Rita caused widespread distribution interruptions to about 125,000 electric customers in the western and southwestern area of Louisiana.

There was no loss of generation associated with this disturbance. Restoration will take several days to complete.

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## 2005 - Disturbance Reports - Public

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**Region:** ERCOT

**Control Area ID:** ERCO

**Date - Time:** 9/23/2005 5:00:00 PM CDT

**Year:** 2005    **Type:** INT

**Utility:** ERCOT ISO

**Category:** Weather

**Cause:** Weather - Hurricane Rita

**Event Description:**

On September 23, 2005 at 1700 CDT, significant electric customer outages began in Houston area due to strong winds associated with rain bands from the approach of Hurricane Rita toward the upper Texas coast. The winds and storms are causing outages throughout the entire area.

Outages to electric customers peaked to 715,000 by 07:00 on September 24, 2005. Crews entered restoration mode at about 07:30 that morning with the first task being reports of lines down across roads as reported by the Houston Police Department and other local officials. Most of the damage was caused by intense wind, lightning and flying debris caused by toppled trees and large branches falling on power lines. The company has more than 4,000 utility personnel from across the country to assist in restoration work. Although crews have been able to bring on large numbers of customers in a short amount of time, some areas have suffered heavier damage, and repairs in these areas may take longer.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** EES

**Date - Time:** 9/23/2005 9:00:00 PM CDT

**Year:** 2005    **Type:** INT

**Utility:** Entergy

**Category:** Weather

**Cause:** Weather - Hurricane Rita

**Event Description:**

On September 24, 2005 at about 06:00 CDT, strong winds associated with Hurricane Rita caused widespread damage to the transmission and distribution systems in coastal areas of Arkansas, Louisiana, Mississippi, and Texas. Because of this storm, electric service to about 787,774 customers was interrupted. Facilities affected included about 271 transmission lines of various voltage levels, and about 275 substations. Two area power plants were also affected by this storm. Restoration will take several days.

(Need better start time for this)

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## 2005 - Disturbance Reports - Public

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**Region:** SPP

**Control Area ID:** CLEC

**Date - Time:** 9/24/2005 6:00:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** Cleco Power LLC

**Category:** Weather

**Cause:** Weather - Hurricane Rita

**Event Description:**

On September 24, 2005 at about 0600 CDT, strong winds associated with Hurricane Rita caused widespread damage to the transmission and distribution systems in costal area of Louisiana. Because of this storm, electric service to about 80,000 customers was interrupted.

(Need better start time for this)

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## 2005 - Disturbance Reports - Public

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**Region:** ERCOT

**Control Area ID:** ERCO

**Date - Time:** 9/24/2005 6:00:00 AM CDT

**Year:** 2005    **Type:** INT

**Utility:** ERCOT ISO

**Category:** Weather

**Cause:** Weather - Hurricane Rita

**Event Description:**

On September 24, 2005 at 0600 CDT, significant electric customer outages began in Texas coast area due to strong winds associated with rain bands from the approach of Hurricane Rita. The winds and storms are causing outages throughout the entire area. Electric service to about 100,000 customers was interrupted because of the storm. Repairs will take several days.

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## 2005 - Disturbance Reports - Public

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**Region:** FRCC

**Control Area ID:** FPL

**Date - Time:** 10/23/2005 11:00:00 PM EDT

**Year:** 2005    **Type:** INT

**Utility:** Florida Power & Light

**Category:** Weather

**Cause:** Weather - Hurricane Wilma

**Event Description:**

On October 23, 2005 starting at about 2300 EDT, Hurricane Wilma came ashore on the southwestern area of Florida causing widespread outages within the transmission and distribution systems. The storm moved from west to east across south Florida and impacted Florida for about 12 hours. There were about 3,200,000 electric customers interrupted because of this storm.

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## 2005 - Disturbance Reports - Public

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**Region:** FRCC

**Control Area ID:** HST

**Date - Time:** 10/24/2005 4:11:00 AM EDT

**Year:** 2005    **Type:** INT

**Utility:** City of Homestead

**Category:** Weather

**Cause:** Weather - Hurricane Wilma

**Event Description:**

On October 24, 2005 EDT, system protection removed from service two high voltage transmission lines from service due to high winds from Hurricane Wilma. This caused the isolation and shut down of a small single system. The high winds caused extensive damage to the distribution system. A total of 17,000 customers were affected by this incident. By 1545 on October 25, 2005, one of the transmission lines had been restored, which allowed the utility to restore electric power to about 1,000 customers.

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## 2005 - Disturbance Reports - Public

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**Region:** NPCC

**Control Area ID:** ISNE

**Date - Time:** 10/25/2005 6:05:00 PM EDT

**Year:** 2005    **Type:** UO

**Utility:** ISO New England Inc.

**Category:** Equipment Failure

**Cause:** Equipment Failure

**Event Description:**

On October 25, 2005 at 1805 EDT, a high voltage dc transmission Intertie was removed from service due to the failure of a reactor at one converter station. The incident did not cause the loss of any customer electric service, or loss of any generation.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** BCTC

**Date - Time:** 11/2/2005 6:43:00 PM PST

**Year:** 2005 **Type:** INT

**Utility:** British Columbia Transmission Company

**Category:** Weather

**Cause:** Weather - Lightning

**Event Description:**

On November 2, 2005 at 1843 PST, system protection removed from service one high voltage transmission line due to a lightning strike. The high voltage transmission line successfully auto-reclosed after the three-phase fault cleared. Because of the loss of the transmission line, a single high voltage step-down transformer was removed from service that was feeding two low voltage distribution feeder circuits. These circuits were carrying about 20 MW of electric customer load.

During the three-phase fault conditions, the voltage dropped significantly on three area high voltage transmission lines. Because of the extreme undervoltage condition, about 350 MW of firm electric customer load was lost. The area's voltage and frequency stabilized within one minute. All firm customer load was restored by 1948 PST. Approximately 2,700 electric customers were interrupted during this incident.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-NWPP

**Control Area ID:** AESO

**Date - Time:** 11/25/2005 MST

**Year:** 2005 **Type:** INT

**Utility:** Alberta Electric System Operator

**Category:** Weather

**Cause:** Weather - Snow, Heavy Wet, and Freezing Rain

### Event Description:

At approximately 1801 MST, system protection removed from service a high voltage transmission line. The probable cause was due to heavy wet snow and freezing rain conditions. At the same time, a special protection system removed from service two additional high voltage transmission lines as designed.

At approximately 1801, MST, a second utility reported that system protection removed from service another high voltage transmission line. The cause of this transmission line tripped was due to a misoperation of the Zone 1 Distance relay. Because these four transmission lines were opened, one of the two systems became separated from the Western Interconnection.

The separated system had been importing energy across the now opened Intertie transmission path. Because of this import, a special protection scheme initiated to drop about 375 MW of interruptible customer load. To counter the loss of system load, a special generating underfrequency fast ramp scheme increased area generation by about 250 MW. All high voltage transmission lines were returned to service by 1819. All interruptible electric customer loads were also restored by 1819.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** DUK

**Date - Time:** 12/15/2005 4:00:00 AM EST

**Year:** 2005    **Type:** INT

**Utility:** Duke Energy Corporation

**Category:** Weather

**Cause:** Weather - Ice Storm

**Event Description:**

On December 15, 2005 at about 0400 EST, a major ice storm caused wide-spread electric customer outages in the distribution systems in South and North Carolina.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** SOCO

**Date - Time:** 12/15/2005 5:05:00 AM EST

**Year:** 2005    **Type:** INT

**Utility:** Southern Company Services, Inc.

**Category:** Weather

**Cause:** Weather - Ice storm

**Event Description:**

On December 15, 2005 at about 0505 EST, a major ice storm caused widespread electric customer outages in the distribution system in parts of northern Georgia. About 52,659 electric customers were interrupted. All electric service was restored by 1210 EST on December 16, 2005.

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## 2005 - Disturbance Reports - Public

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**Region:** SERC

**Control Area ID:** GSOC

**Date - Time:** 12/15/2005 11:00:00 AM EST

**Year:** 2005    **Type:** INT

**Utility:** Georgia System Operations Corporation

**Category:** Weather

**Cause:** Weather - Ice storm

**Event Description:**

On December 15, 2005 at about 1100 EST, an ice storm hit the northern portion of Georgia causing approximately 52,000 electric customer outages in the distribution system due to ice laden trees falling on distribution lines. In addition, there were several high voltage transmission lines outages during the early morning hours to about 1500 on 12/15/2005. All high transmission lines were restored by 1500 on 12/15/2005. By 1800 on December 16, 2005, electric service had been restored on all customers.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** CISO

**Date - Time:** 12/18/2005 3:15:00 PM PST

**Year:** 2005    **Type:** INT

**Utility:** California Independent System Operator

**Category:** Weather

**Cause:** Weather - Rain and High Winds

**Event Description:**

On December 18, 2005 at 15:15 PST, a winter storm with heavy rains and high winds caused widespread electric distribution outages of about 60,000 electric customers in the San Francisco Bay Area. By about 2300 on December 18, 2005 electric service was restored on all affected electric customers.

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## 2005 - Disturbance Reports - Public

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**Region:** WECC-CAMX

**Control Area ID:** CISO

**Date - Time:** 12/31/2005 6:00:00 AM PST

**Year:** 2005 **Type:** INT

**Utility:** California Independent System Operator

**Category:** Weather

**Cause:** Weather - Rain and High Winds

### Event Description:

Beginning on December 30, 2005 a series of strong Pacific storms swept through northern and central areas of a utilities service area. These storms had been preceded by an extended period of wet weather that while not severe enough to cause significant customer outages had, nonetheless, left the ground saturated. As the storm beginning on December 30 strengthened, it brought torrential rain and strong gusty winds. On top of the already saturated ground, the additional rainfall and winds caused extensive and rapid flooding and toppled many trees. The storm passed through the area by mid-day on the 31st but was quickly followed by a second wave of storms that punished the area on January 1 and 2 before beginning to clear out on January 3. The storms brought 7-11 inches of rain to communities along the coast, 4-6 inches in the central valley and 5-7 inches in the foothills as well as up to 10 feet of snow in the upper elevations of the mountain areas. The torrential rains triggered widespread flooding and numerous mudslides and rockslides. Strong winds with gusts from 60-80 miles per hour caused further damage as trees toppled and poles were snapped off.

The heavy winds associated with the series of storms caused extensive damage to the distribution and transmission system. On the distribution system, some 530 poles, 459 transformers and 1760 spans of wire were damaged. Ninety one transmission lines were affected by the storms including twenty six 115kV, fifteen 70kV and fifty two 60kV transmission lines. The impacts of the storm ranged from momentary outages to broken cross-arms to collapsed towers or broken poles. Additionally, one 500kV transmission line was forced out of service when floodwaters caused its telemetry and relay protection systems to be unreliable. In all, 157 transmission poles (and/or towers) were damaged along with 35 spans of wire.

Twenty generating stations (primarily cogenerator units and hydroelectric generators) were either interrupted or rendered unavailable by the outages on the transmission system. A total of 1,669 MW of generation was affected.

A small area islanded at 1034 on 01/02/06 when a double circuit of high voltage transmission lines were removed from service by system protection due to trees falling into the lines. The area load at the time was about 80 MW and was served continuously throughout the islanding event by internal generation. At 1126 the high voltage transmission lines were restored and the island was synchronized to the system at 1144 on 01/02/06.

The series of storms began to cause a significant number of retail customer outages at about 0500 on December 31. By 1000 there were nearly 250,000 customers without power. Customer outages peaked at approximately 310,000 outages at 1300. Crews worked to restore power to those locations to which access was not impeded by mud or rock slides, flooding or fallen trees. Mutual aid crews were brought in from Southern California Edison to assist with restoration efforts. At midnight on December 31 there were about 120,000 customers without power. As access to outage locations improved, additional customers were restored. However, the next storms arrived before all customers could be restored and the number of customers without power fluctuated between about 60,000 and 175,000 throughout January 1 and 2 as crews worked to restore customers even as the storm was causing other customers to lose power.

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