

2003 - Disturbance Index - Public

Date	Region	Utilities	Type	MW	Customers	Cause
03-Jan-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	0	0	Maintenance Error - Inadvertent Trip
18-Jan-03	WECC-NWPP	NorthWestern Energy - Montana	UO	0	0	SPS Misoperation
19-Jan-03	WECC-NWPP	NorthWestern Energy - Montana	UO	0	0	SPS Misoperation
24-Jan-03	FRCC	Jacksonville Electric Authority	VR	N/A	N/A	Weather - Cold - Severe
03-Feb-03	NPCC-Ontario	Independent Electricity Market Operator	UO	0	0	Weather - Freezing Rain - Insulator Contamination
13-Feb-03	WECC-NWPP	PacifiCorp East	UO	700	200,000	Third Party - Dump Truck contacting tower structure
23-Feb-03	WECC-CAMX	Los Angeles Department of Water & Power	UO	30	1	Third Party - Static wire down by airplane contact
27-Feb-03	SERC-VACAR	Duke Energy Corporation	INT	1,000	350,000	Weather - Ice Storm - Severe
02-Mar-03	WECC-CAMX	Comision Federal de Electricidad	UO	0	0	Sys. Prot. - Line Fault
07-Mar-03	WECC-AZNMSNV	Public Service Company of New Mexico	UO	0	0	Third Party - Static wire down by airplane contact
10-Mar-03	WECC-CAMX	Comision Federal de Electricidad	INT	0	0	Sys. Prot. - Line Fault
21-Mar-03	WECC-CAMX	California Independent System Operator, Southern California Edison Company	UO	300	1	Equipment Failure - Transformer Failure
22-Mar-03	WECC-NWPP	Brisish Columbia Hydro & Power Authority	INT	1,080	135,000	Sys. Prot. - Line Fault
26-Mar-03	WECC-NWPP	PacifiCorp Western System	UO	0	0	Human Error
04-Apr-03	ECAR	Consumers Energy	INT	N/A	425,000	Weather - Ice Storm - Severe
07-Apr-03	WECC-CAMX	California Independent System Operator	UO	650	N/A	Sys. Prot. - Cause Unknown
15-Apr-03	ERCOT	ERCOT ISO, CenterPoint Energy, Bryan Texas Utilities	INT	212	68,530	Sys. Prot. - Erroneous Trip Signal

Date	Region	Utilities	Type	MW	Customers	Cause
02-May-03	SERC-VACAR	Duke Energy Company	INT	1,500	139,000	Weather
03-May-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	0	0	SPS Misoperation
04-May-03	SERC-TVA	Tennessee Valley Authority	INT	N/A	14,825	Weather - TORNADOS
10-May-03	MAIN	Commonwealth Edison	UO	0		Weather - TORNADOS
11-May-03	MAIN	Commonwealth Edison	INT	N/A	65,000	Weather - Severe
15-May-03	ERCOT	ERCOT ISO	INT	1,549	419,863	Equipment Failure - Insulator Failure - Sys. Prot. Malfunction
15-May-03	MAIN	Wisconsin Electric Power Company	PA	240	2	Weather - Flooding
28-May-03	WECC-NWPP	Bonneville Power Administration	UO	0	0	OSL Violation
29-May-03	WECC-CAMX	Los Angeles Department of Water & Power, Bonneville Power Administration	UO	0	0	Equipment Failure
22-Jun-03	MAPP	Minnesota Power Company	UO	0	0	Sys. Prot. - Line Fault and Sys.Prot. Misoperation
24-Jun-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	260	N/A	Equipment Failure - Smoke Contamination
01-Jul-03	WECC-AZNMSNV	Arizona Public Service Company	INT	1,000	48,000	Equipment Failure
17-Jul-03	MAIN	Commonwealth Edison	INT	N/A	80,000	Weather
21-Jul-03	MAAC	PPL Electric Utilities	INT	1,000	185,000	Weather - Lightning and Thunderstorms - Severe
28-Jul-03	WECC-AZNMSNV	Arizona Public Service Company, Salt River Project	INT	440	90,000	Human Error
30-Jul-03	MAIN	Minnesota Power	UO	80	N/A	Weather - Lightning
10-Aug-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	0	0	Weather - Lightning
12-Aug-03	WECC-NWPP	British Columbia Hydro Authority	INT	465	7,400	Equipment Failure
13-Aug-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	0	0	Sys. Prot. - Cause Unknown
14-Aug-03	MAIN	Midwest ISO	INT	18,500	N/A	Major Blackout
14-Aug-03	NPCC-Ontario	Independent Electricity Market Operator	INT	20,867	11,000,000	Major Blackout
14-Aug-03	ECAR	First Energy Corp.	INT	7,000	1,203,000	Major Blackout

Date	Region	Utilities	Type	MW	Customers	Cause
14-Aug-03	NPCC-Quebec	Hydro-Quebec TransEnergie	INT	100	N/A	Major Blackout
14-Aug-03	NPCC-ISO-NE	ISO New England	INT	N/A	2,500	Major Blackout
14-Aug-03	NPCC-NYISO	Consolated Edison Company of N.Y.	INT	11,202	3,125,350	Major Blackout
14-Aug-03	NPCC-Maritimes	New Brunswick Power	INT	0	0	Major Blackout
16-Aug-03	NPCC-NYISO	Consolidated Edison Company of New York	PA	N/A	N/A	Public Appeal - Insufficient Capacity
17-Aug-03	SERC-Entergy	Entergy Energy Services	INT	500	65,000	Equipment Failure
26-Aug-03	NPCC-Quebec	Hydro-Quebec TransEnergie	UO	0	0	Weather - Lightning
04-Sep-03	NPCC-Quebec	Hydro-Quebec- TransEnergie	UO	0	0	Sys. Prot. - Cause Unknown
12-Sep-03	MAPP	Minnkota Power Cooperative, Otter Tail Power Company	UO	22	4,090	SPS Misoperation - Flashover and SPS misoperation
15-Sep-03	MAAC	PJM	UO	400	45,000	Weather - Lightning - Relay Missoperation
18-Sep-03	SERC-VACAR	Dominion - Virginia Power, North Carolina Power	INT	6,512	1,800,000	Weather - Hurricane Isabel
18-Sep-03	SERC-VACAR	Carolina Power & Light (Progress Energy)	INT	1655	320,000	Weather - Hurricane Isabel
18-Sep-03	MAAC	Conectiv Power Delivery	INT	600	120,000	Weather - Hurricane Isabel
18-Sep-03	MAAC	PPL EU	INT	1,300	350,000	Weather - Hurricane Isabel
20-Sep-03	MAAC	PJM	UO	0	0	Weather - High Winds - Salt Contamination
28-Sep-03	NPCC-Maritimes	Nova Scotia Power	INT	412	300,000	Weather - Hurricane Juan
09-Oct-03	WECC-NWPP	North Western Energy	UO	0	0	Sys. Prot. - Cause Unknown
26-Oct-03	WECC-CAMX	San Diego Gas & Electric Co.	INT	N/A	90,000	Fires - Brush Fires
12-Nov-03	ECAR	Cinergy	UO	0	0	Equipment Failure - EMS Loss
13-Nov-03	NPCC-NYISO	Niagara Mohawk	INT	180	50,280	Weather - High Winds
13-Nov-03	SERC	Dominion - Virginia Power and North Carolina Power	INT	67,000	N/A	Weather - High Winds

Date	Region	Utilities	Type	MW	Customers	Cause
26-Nov-03	NPCC-Quebec	HydroQuebec Transenergie	UO	0	0	Human Error - Inadvertent Trip
01-Dec-03	NPCC-ISO-NE	ISO-New England	INT	630	300,000	Off-Normal Operation
04-Dec-03	WECC-NWPP	Puget Sound Energy	INT	175	175,000	Weather - High Winds
04-Dec-03	MAIN	Wisconsin Electric Power Company	INT	500	36,000	Sys. Prot. - Cause Unkown
05-Dec-03	FRCC	City of Howestead	INT	27	16,500	Equipment Failure - Sys. Prot. Misoperation
05-Dec-03	NPCC-Quebec	Hydro-Quebec Transenergie	UO	0	0	Equipment Failure - Malfunction
09-Dec-03	SERC-Entergy	Entergy	UO	0	0	Equipment Failure
22-Dec-03	NPCC-Ontario	The IMO	UO	0	0	Equipment Failure
23-Dec-03	MAAC	FirstEnergy - Jersey Central P&L	UO	0	80,000	Human Error
26-Dec-03	NPCC-HQ	HydroQuebec TransEnergie	INT	630	10	Weather

2003 - Number of Disturbances by Region - Public

Region	Disturbances
ECAR	3
ERCOT	2
FRCC	2
MAAC	6
MAIN	7
MAPP	2
NPCC-HQ	1
NPCC-ISO-NE	2
NPCC-Maritimes	2
NPCC-NYISO	3
NPCC-Ontario	3
NPCC-Quebec	10
SERC	1
SERC-Entergy	2
SERC-TVA	1
SERC-VACAR	4
WECC-AZNMSNV	3
WECC-CAMX	7
WECC-NWPP	9
Total Number of Disturbances:	70

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 1/3/2003 2:10:00 PM EST

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Maintenance Error

Cause: Maintenance Error - Inadvertent Trip

Event Description_Clean:

On January 3, 2003 at 1410 EST, system protection inadvertently removed from service two high voltage transmission lines due to a maintenance procedure error. As a result of this event, system protection removed from service 1,749 MW of generation. No customer demand was lost due to this event.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: NWMT

Date_Time: 1/18/2003 11:04:00 PM MS

Year: 2003 **Type:** UO

Utility: Northwest Energy - Montana

CauseCategory: SPS Misoperation

Cause: SPS Misoperation

Event Description_Clean:

On January 18, 2003 at 2304, two generating units tripped off line due to a RAS scheme misoperation. The frequency deviation went to 59.849 Hz and returned to pre-disturbance level of 59.994 Hz by 2319 MST. Both generating units were returned to service by 2349 MST.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: NWMT

Date_Time: 1/19/2003 12:12:00 AM MS

Year: 2003 **Type:** UO

Utility: Northwest Energy - Montana

CauseCategory: SPS Misoperation

Cause: SPS Misoperation

Event Description_Clean:

On January 19, 2003 at 0012, three generating units tripped off line due to a RAS scheme misoperation. The frequency deviation went to 59.908 Hz and returned to pre-disturbance level by 0019 MST.

2003 - Disturbance Reports - Publi

Region: FRCC

Control Area ID: JEA

Date_Time: 1/24/2003 7:00:00 AM EST

Year: 2003 **Type:** VR

Utility: JEA

CauseCategory: Weather

Cause: Weather - Cold - Severe

Event Description_Clean:

On January 24, 2003 at 0700, a Florida utility implemented a 5% voltage reduction for control area demand relief due to extremely cold weather. At 0800, the voltage reduction was cancelled.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: IMO

Date_Time: 2/3/2003 11:19:00 PM EST

Year: 2003 **Type:** UO

Utility: Ontario - Independent Electricity Market Operator

CauseCategory: Weather

Cause: Weather - Freezing Rain - Insulator Contamination

Event Description_Clean:

During the evening of February 3, 2003, five hours of freezing rain occurred concentrated around a major high voltage switching-center. This weather, followed by warming temperatures and combined with suspected insulator contamination, resulted in system protection removing from service various transmission elements. This caused a separation between two areas of the transmission system, and altered the flow of generation, which constrained portions of the remaining transmission elements. Because of these constraints, the system operators readjusted area generation so that the transmission system could withstand any subsequent contingencies, which could lead to additional separations. Restoration efforts were hampered until warming temperatures and rain melted ice. No generation or customer demand was lost during this event.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: PACE

Date_Time: 2/13/2003 11:08:00 AM MS

Year: 2003 **Type:** UO

Utility: PacifiCorp-East

CauseCategory: Third Party

Cause: Third Party - Dump Truck contacting tower structure

Event Description_Clean:

Status before the disturbance:

There was scheduled maintenance to replace an existing high voltage step down transformer at a switching center adjacent to this incident.

On February 13, 2003 at 11:08 MST, system protection removed two transmission lines when a third-party dump truck struck a tower structure causing a static line to fall into the transmission lines. As a result of this accident, system protection removed from service the remaining high voltage step down transformer, which caused the loss of electric service to approximately 200,000 customers. The system frequency rose to 60.01 Hz. In addition, system protection removed from service multiple generating units. The system frequency then declined to 59.970 Hz and recovered to its pre-disturbance level within 8 seconds. By 1730 MST, all electric service to customers was restored and all generating units returned to service.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: LDWP

Date_Time: 2/23/2003 5:55:00 PM PST

Year: 2003 **Type:** UO

Utility: Los Angeles Department of Water and Power

CauseCategory: Third Party

Cause: Third Party - Static wire down by airplane contact

Event Description_Clean:

Status before the disturbance:

The system was being operated normally with the exception that a single high voltage transmission line was out of service for scheduled maintenance.

On February 23, 2003 at approximately 1755 PST, system protection removed from service a high voltage transmission line due to an airplane severing a static wire between two tower structures. Concurrent with this incident, system protection removed from service another high voltage transmission line and both poles of a nearby high voltage dc transmission line. In addition, system protection removed from service some generating units within the region, and a single industrial customer shed approximately 30 MW of demand. The system frequency ranged from 59.980 Hz to 59.799 Hz and was normal within 12 minutes.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: DUK

Date_Time: 2/27/2003 11:32:00 AM EST

Year: 2003 **Type:** INT

Utility: Duke Energy Corporation

CauseCategory: Weather

Cause: Weather - Ice Storm - Severe

Event Description_Clean:

On February 27, 2003, a major ice storm caused system-wide power outages to large portions of the distribution system within several counties. Between 52,000 and 350,000 customers were affected by these power outages.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: CFE

Date_Time: 3/2/2003 5:47:00 AM PST

Year: 2003 **Type:** UO

Utility: Comision Federal de Electricidad

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Line Fault

Event Description_Clean:

Status before the disturbance:

The system was being operated normally with the exception that a single high voltage transmission line was out of service for scheduled maintenance.

On March 2, 2003 at 0547, system protection removed from service a high voltage transmission line, which caused a small island between two portions of the Interconnection. At 0609, the islanded system paralleled to the Interconnection. No generation or customer demand lost because of this incident.

2003 - Disturbance Reports - Publi

Region: WECC-AZNMSNV

Control Area ID: PNM

Date_Time: 3/7/2003 7:18:00 PM MS

Year: 2003 **Type:** UO

Utility: Public Service Company of New Mexico

CauseCategory: Third Party

Cause: Third Party - Static wire down by airplane contact

Event Description_Clean:

On March 7, 2003 at 1918 MST, system protection removed from service two high voltage transmission lines, which run parallel in the same right-of-way. The cause of this incident was found to be a small airplane contacting a static wire on one circuit and carrying into the adjacent circuit. In conjunction with this incident, a sub-transmission bus differential relay mis-operated in an adjacent system at a back-to-back dc converter station. This caused system protection to remove from service a third high voltage transmission line in the system where the incident occurred. No generation or customer demand was lost due to this incident.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: CFE

Date_Time: 3/10/2003 11:23:00 PM PST

Year: 2003 **Type:** INT

Utility: Comision Federal de Electricidad

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Line Fault

Event Description_Clean:

Status before the disturbance:

The system was being operated normally with the exception that a single high voltage transmission line was out of service for scheduled maintenance. There was also a report of heavy fog in the area of the fault.

On March 10, 2003 at 2323 PST, system protection removed from service a high voltage transmission line, which caused a small island between two portions of the Interconnection. At 2345, the islanded system paralleled to the Interconnection. No generation or customer demand was lost due to this incident.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: CISO

Date_Time: 3/21/2003 6:38:00 PM PST

Year: 2000 **Type:** UO

Utility: California Independent System Operator

CauseCategory: Equipment Failure

Cause: Equipment Failure -Transformer Failure

Event Description_Clean:

On March 21, 2003 at 1838 PST, system protection removed from service one bus and a high voltage step-down transformer due to an internal fault and resulting fire on the transformer. At 1847, system protection removed from service another bus and the remaining two high voltage step-down transformers due to the fire. As a result of this incident all high voltage transmission lines, which were connected to these buses, were opened ended, and the three high voltage step-down transformers were taken out of service. In addition, some firm customer demand was lost at a nearby site due to low area voltage. The system frequency varied from 59.991 Hz to 60.019 Hz and returned to normal within two minutes.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: BCHA

Date_Time: 3/22/2003 6:50:00 AM PST

Year: 2003 **Type:** INT

Utility: B.C. Hydro & Power Authority

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Line Fault

Event Description_Clean:

Status before the disturbance:

The system was operating normally with the exception of a scheduled maintenance outage of one pole of a high voltage DC transmission line. There were high winds with a mix of snow, rain and lightning activity in the area.

On March 22, 2003 at 0650 PST, system protection removed from service two high voltage transmission lines. As a result of this incident, two additional high voltage transmission lines were removed from service by system protection to protect a section of undersea cables because of high voltages at one end of the cables. This caused one area of the system to become islanded from the main system. However, an asynchronous high voltage dc transmission line remained in service to supple some area loads. System protection removed from service some area bulk transmission loads to prevent overloading the low voltage transmission lines in the northern section of the islanded area. Because the islanded area was generation deficient, some underfrequency load shedding occurred. Some additional generating units were removed from service by system protection, further reducing area generation. The frequency in the islanded area declined to 56.94 Hz and rose to 61.29 Hz after the underfrequency load shedding occurred. The high voltage dc transmission line's frequency controller reduced imports to correct the frequency to 60.00 Hz.

The islanded area was synchronized to the main system using two normally open low voltage transmission lines. As area generation was returned to service, customer loads were resorted. By 0914, all customer loads were restored. Electric service was interrupted to approximately 135,000 customers by this incident.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: PACW

Date_Time: 3/26/2003 9:19:00 AM PST

Year: 2003 **Type:** UO

Utility: PacifiCorp-West

CauseCategory: Human Error

Cause: Human Error

Event Description_Clean:

On March 26, 2003 at 0919 PST, three generating units were removed from service by system protection due to human error. At about 0924 PST, a fourth generating units was removed from service by system protection. The cause of this fourth unit outages was not determined. The system frequency varied from 59.84 Hz to 59.95 Hz and was normal by 0932 PST. There were no additional facilities or customer loads affected by this incident.

2003 - Disturbance Reports - Publi

Region: ECAR

Control Area ID: MECS

Date_Time: 4/4/2003 7:00:00 PM CST

Year: 2003 **Type:** INT

Utility: Michigan Electric Coordinated System

CauseCategory: Weather

Cause: Weather - Ice Storm - Severe

Event Description_Clean:

On Thursday April 3, 2003, a stationary front extended from west to east across mid-Michigan and produced a heavy, icy precipitation that affected the Flint and tri-city area of Saginaw, Midland and Bay City. The front remained in place throughout the day on Friday, producing a mixture of precipitation. Friday evening, as temperatures dropped, the area and intensity of the icy precipitation grew. Areas minimally affected on Thursday including Grand Rapids, Hastings, Greenville, Alma, Lansing and Owosso received the most significant damage from this second wave of icy precipitation.

Electric service was interrupted to approximately 425,000 customers due to the storm, with about 196,000 off at one time. Most electric service was restored by 2400 hours on April 8, 2003.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: CISO

Date_Time: 4/7/2003 12:19:00 AM PDT

Year: 2003 **Type:** UO

Utility: California Independent System Operator

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Cause Unknown

Event Description_Clean:

On April 7, 2003 at 0019 PDT, one of two generating unit's circuit breakers failed to open as the generating plant operator was removing the unit from service. At about the same time, system protection removed from service three nearby high voltage transmission lines. As a result of this some area customer demand was shed. By 0027 PDT, all customer demand was restored.

2003 - Disturbance Reports - Publi

Region: ERCOT

Control Area ID: ERCO

Date_Time: 4/15/2003 11:39:00 AM CDT

Year: 2003 **Type:** INT

Utility: ERCOT ISO

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Erroneous Trip Signal

Event Description_Clean:

ERCOT disturbance
April 15, 2003

On Tuesday April 15, 2003, at about 1130 hours, during the switching of an unrelated 345 kV transmission line for scheduled maintenance, an apparently erroneous trip signal was sent to a remote 345 kV switching device at a generating station. The remote 345 kV switching device failed to open. As a result of this incident, the breaker failure scheme at the generating station operated for both 345 kV buses. Consequently, system protection removed from service several 345 kV lines and two 345/138 kV autotransformers. This resulted in an inadequate supply of power to the 138 kV transmission system in the surrounding area, and depressed the 138 kV voltages below acceptable levels in the area. In addition, system voltage effects caused by the disturbance resulted in about 330 MW of customer load being shed.

During the disturbance, communications between the generating station, and the transmission operator's control center was interrupted and the system operators were unable to obtain real-time data from the 345 kV switchyard. This loss of real-time data meant that a visual inspection of the 345 kV switchyard would be required before system operators could begin restoration. At about 1600 hours the system and all customer load was restored.

This needs to be cleaned up.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: DUK

Date_Time: 5/2/2003 5:00:00 PM EDT

Year: 2003 **Type:** INT

Utility: Duke Energy Corporation

CauseCategory: Weather

Cause: Weather

Event Description_Clean:

On May 2, 2003, a series of thunderstorms, lightning and strong winds crossed the service territory. By about 2040, electric service to approximately 139,000 customers was interrupted due to these storms (approximately 1,500 MW). Restoration efforts started with the first interruptions and completed by 12:00 on May 23, 2003.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 5/3/2003 12:18:00 AM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: SPS Misoperation

Cause: SPS Misoperation

Event Description_Clean:

On May 3, 2003 at 0018 EDT, a special protection scheme at a generating station removed five generating units from service because a trip signal was sent when a high voltage transmission line was removed from service for voltage control. The system frequency went to 59.00 Hz and immediately recovered to normal.

The utility involved determined that the cause of this incident that the default set points for the generating units were implemented as a result of the SPS's main computer being removed from service because of a problem. When the high voltage transmission line was manually removed from service for voltage control, the open line detection scheme of the SPS functioned normal and sent the trip signal to the generating units. The set points should have been set to zero during the outage of the main SPS computer, which would have prevented this incident. The utility involved is investigating the reason for the main computer outage. No other facilities or customer demand was lost due to this incident.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: TVA

Date_Time: 5/4/2003 11:32:00 PM EDT

Year: 2003 **Type:** INT

Utility: Tennessee Valley Authority ESO

CauseCategory: Weather

Cause: Weather - Tornados

Event Description_Clean:

Between 23:32 EDT on May 4, 2003 to 11:28 EDT on May 7, 2003, a series of tornadoes were reports to have caused damage to several high voltage transmission, subtransmission and distribution lines in four southern states. As a result of these tornadoes, electric service was interrupted to approximately 14, 825 customers. By 15:19 on May 6, 2003 all customer demand was restored.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: CE

Date_Time: 5/10/2003 9:53:00 PM CDT

Year: 2003 **Type:** UO

Utility: Commonwealth Edison

CauseCategory: Weather

Cause: Weather - Tornados

Event Description_Clean:

On May 10, 2003 at 21:52, a reported tornado caused damage to several high voltage transmission lines. No generation or customer demand was lost due to this incident.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: CE

Date_Time: 5/11/2003 1:00:00 PM CDT

Year: 2003 **Type:** INT

Utility: Commonwealth Edison

CauseCategory: Weather

Cause: Weather - Severe

Event Description_Clean:

At approximately 13:00 CDT on May 11, 2003, electric service to approximately 50,000 customers was interrupted as a result of strong winds. Most customer outages were distribution related problems.

2003 - Disturbance Reports - Publi

Region: ERCOT

Control Area ID: ERCO

Date_Time: 5/15/2003 2:54:00 AM CDT

Year: 2003 **Type:** INT

Utility: ERCOT ISO

CauseCategory: Equipment Failure

Cause: Equipment Failure - Insulator Failure - Sys.
Prot. Malfunction

Event Description_Clean:

On May 15, 2003 at about 0254 CDT, lightning struck and damaged a high voltage transmission line near a large power plant in North Texas. The damaged line resulted in the loss of a large amount of electric generation, which affected a small percentage of customers throughout most of the ERCOT region. The remaining generation was insufficient to serve the load on the grid at that time. Automatic control systems located all across the ERCOT Region operated to reduce load and prevent a major disturbance. These control systems operated as designed, and all customer service was restored by approximately 0630.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: WEC

Date_Time: 5/15/2003 2:00:00 PM CDT

Year: 2003 **Type:** PA

Utility: Wisconsin Energy Corporation

CauseCategory: Weather

Cause: Weather - Flooding

Event Description_Clean:

On May 15, 2003 from 14:00 to 22:00 hours, a utility company issued public appeals for the reduction of customer demands. The utility company issued the public appeals due to the loss of area generation caused by flooding. Approximately 240 MW of interruptible load was shed, which involved two customers.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: BPAT

Date_Time: 5/28/2003 6:14:00 AM PST

Year: 2003 **Type:** UO

Utility: Bonneville Power Administration Transmission

CauseCategory: OSL Violation

Cause: OSL Violation

Event Description_Clean:

On May 28, 2003 at 05:02, system operators removed from service a high voltage transmission line to repair broken conductors at several locations. This outage reduced the Operating Transfer Capability (OTC) of an internal path by 1,500 MW. When system operators were unable to reduce the flow on the internal path below the new OTC, the transmission line was restored to service. At 0614 PDT, the line was again removed from service. Area hydro generation could not be adjusted, due to environmental constraints, fast enough to reduce the flow on the internal path below the new OTC level. As a result, the OCT limit was violated for 35-minutes. Interchange transactions between four different control areas had to be reduced to help control the flows.

The system frequency varied from 60.042 to 59.976 Hz during this time.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: LDWP

Date_Time: 5/29/2003 5:04:00 PM PDT

Year: 2003 **Type:** UO

Utility: Los Angeles Department of Water and Power

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

Status before the disturbance:

On May 29, 2003 at about 1656 PDT, a single pole of a high voltage dc transmission line momentarily blocked by system protection due to an apparent lightning strike. The special protection scheme operated correctly inserting various series and shunt capacitors and operating a special Transient Excitation Boost scheme at a generating plant to control system voltages and power flows.

Disturbance:

On May 29, 2003 at about 1704 PDT, a high voltage dc converter station power factor capacity switcher (circuit breaker) failed while opening the switcher in response to a signal from the reactive power controller. This fault was properly cleared by system protection. However, the fault caused a severe voltage drop in the area, which caused the loss of one pole of the high voltage dc transmission line. Again the special protection scheme operated correctly inserting various series and shunt capacitors and operating a special Transient Excitation Boost scheme. In addition, some area generating units were removed from service, as designed, by the special protection scheme. These actions are taken to protect various transmission elements, control voltages and power flows during an outage of the high voltage dc transmission line. The system frequency recovered to pre-disturbance level by 1714 PDT. There were no other facilities or customer loads lost as a result of this incident.

2003 - Disturbance Reports - Publi

Region: MAPP

Control Area ID: MP

Date_Time: 6/22/2003 11:44:00 PM CDT

Year: 2003 **Type:** UO

Utility: Minnesota Power, Inc.

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Line Fault and Sys.Prot.
Misoperation

Event Description_Clean:

On June 22, 2003 at 23:44 CDT, system protection removed from service a single high voltage transmission line due to a permanent fault. The initial disturbance, and subsequent reclosure of this transmission line caused several protection system misoperations to occur resulting in system protection removing for additional high voltage transmission lines.

As a result of this these operations, generation from a single generating station was forced through a single high voltage transmission line, which resulted in overloading this transmission line. A generation runback scheme automatically initiated the runback of two generating units. Before the runback sequence was completed, the system operator reclosed one of the high voltage transmission line, which eliminated the need for further generation reduction. By June 23, 2003 at 00:04 CDT, the system was normal. No generation or customer demand was lost due to this event.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 6/24/2003 2:03:00 PM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Equipment Failure

Cause: Equipment Failure - Smoke Contamination

Event Description_Clean:

On June 24, 2003 at 1339 EDT, system protection momentarily removed from service a high voltage transmission line due to a faulted shunt reactor. At 1400 EDT, the line was manually removed from service to isolate and inspect the shunt reactor. When the line was removed from service a special protection scheme (SPS) timer was armed.

At 1403 EDT, system protection removed from service an adjacent high voltage transmission line due to smoke contamination caused by the burning shunt reactor on the other line. As a result of the second line being removed from service, the SPS initiated generator tripping of 2,200 Mw of generation from a nearby generating station. The system frequency declined to 58.66 Hz, which caused underfrequency relaying to shed approximately 260 Mw of firm demand.

At 1413 EDT, all generating units were restored. At 1439 EDT, all customer demand was restored.

2003 - Disturbance Reports - Publi

Region: WECC-AZNMSNV

Control Area ID: AZPS

Date_Time: 7/1/2003 3:15:00 PM MS

Year: 2003 **Type:** INT

Utility: Arizona Public Service Company

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

On July 1, 2003 at 1515 MST, system protection removed from service a high voltage bus and two step-down transformers due to a catastrophic failure of the circuit breaker for a high voltage line shunt capacitor bank. At about the same time, system protection removed from service two additional high voltage transmission lines. As a result of removing the high voltage step down transformer, approximately 1,000 MW of firm demand was lost. Approximately 48,000 customers were affected by this event. 1533 MST restored all transmission lines and the electric service to all customers.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: CE

Date_Time: 7/17/2003 7:00:00 PM CDT

Year: 2003 **Type:** INT

Utility: Commonwealth Edison

CauseCategory: Weather

Cause: Weather

Event Description_Clean:

During the evening of July 17, 2003, severe storms with high winds moved across Northern Illinois causing wide-spread customer outages. Most customer outages were south of the Chicago metro area and the southeastern portion of the service territory. Approximately 50,000 customers were affected by this event.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PPL EU

Date_Time: 7/21/2003 5:15:00 PM EDT

Year: 2003 **Type:** INT

Utility: PPL Electric Utilities

CauseCategory: Weather

Cause: Weather - Lightning and Thunderstorms -
Severe

Event Description_Clean:

On July 21, 2003 at 1730 EDT, a severe thunder and lightning storm, with high winds, caused widespread customer outages through the night and into the next morning. Approximately 185,000 customers were affected by this storm.

2003 - Disturbance Reports - Publi

Region: WECC-AZNMSNV

Control Area ID: AZPS

Date_Time: 7/28/2003 6:54:00 PM MS

Year: 2003 **Type:** INT

Utility: Arizona Public Service Company

CauseCategory: Human Error

Cause: Human Error

Event Description_Clean:

On July 28, 2003 at 1854 MST, system protection removed from service a total of 2,687 MW of generation (five generating units). The generating units were located at four different generating stations within the immediate area. Because of the resulting frequency disturbance, the control area operator manually shed 440 MW of firm customer load and received an additional 400 MW of emergency assistance from a neighboring system. The system frequency was restored by 1914. Preliminary indications are that a station ground switch was inadvertently left closed during routine switching at a high voltage transmission substation in an adjacent control area. Approximately 90,000 customers were affected by the manual load shedding. All customer load was restored by 2035 MST.

2003 - Disturbance Reports - Publi

Region: MAPP

Control Area ID: MP

Date_Time: 7/30/2003 4:22:00 PM CDT

Year: 2003 **Type:** UO

Utility: Minnesota Power, Inc.

CauseCategory: Weather

Cause: Weather - Lightning

Event Description_Clean:

On July 30, 2003 at 1617 CDT, system protection removed a high voltage transmission line from service due to lightning. One terminal end closed successfully, however the other end remained open due to excessive phase angle across the open circuit breaker, which was in excess of the maximum allowed by the sync-check relay. This event resulted in an overload on two other high voltage transmission lines, which initiated a generator runback scheme.

As generation was being reduced, system protection removed from service the two overloaded high voltage transmission lines due to lightning. The result of this event initiated a generating tripping scheme, and caused the islanding of a small area. Approximately 80 MW of load was balanced with generation available inside the islanded area.

After the frequency was stabilized, several unsuccessful attempts were made to re-synchronize the island. At 1707 CDT, the islanded area was shut down manually by system operators. At 1709 CDT, all high voltage transmission lines were back in service, and the control area began to restore customer load.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 8/10/2003 2:09:00 PM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Weather

Cause: Weather - Lightning

Event Description_Clean:

On 8/10/2003 at 1409 EDT, system protection simultaneously removed from service several high voltage transmission lines due to lightning. This event initiated an special protection system, which removed a total of 776 MW of generation from service. AT 1409 EDT, all high voltage transmission lines were restored. No customer demand was lost due to this event.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: BCHA

Date_Time: 8/12/2003 8:31:00 PM PDT

Year: 2003 **Type:** INT

Utility: B.C. Hydro & Power Authority

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

On August 12, 2003 at 2031 PDT, system protection removed from service a high voltage transmission line due to a broken crossarm on one tower structure. This line is a single source of power for approximately 7,400 customers. In addition, system protection removed from service approximately 856 MW of area generation. As a result of the loss of generation, approximately 450 MW of industrial demand was shed. By about 2131 PDT, all generation and customer demand was restored.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 8/13/2003 10:55:00 PM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Cause Unknown

Event Description_Clean:

On August 13, 2003 at 22:55:04 system protection removed from service multiple generating units from a single generating plant. This caused a loss of 550 MW of generation and a transient frequency drop from 60 Hz to 59.58 Hz. There was no customer load lost because of this event. Cause under investigation.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: MISO

Date_Time: 8/14/2003 3:00:00 PM CDT

Year: 2003 **Type:** INT

Utility: Midwest ISO

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: IMO

Date_Time: 8/14/2003 3:11:00 PM EST

Year: 2003 **Type:** INT

Utility: Ontario - Independent Electricity Market Operator

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: ECAR

Control Area ID: FE

Date_Time: 8/14/2003 4:10:00 PM EDT

Year: 2003 **Type:** INT

Utility: American Transmission Systems, Inc.

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 8/14/2003 4:10:00 PM EDT

Year: 2003 **Type:** INT

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: ISNE

Date_Time: 8/14/2003 4:10:00 PM EDT

Year: 2003 **Type:** INT

Utility: ISO New England Inc.

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: NYIS

Date_Time: 8/14/2003 4:11:00 PM EDT

Year: 2003 **Type:** INT

Utility: New York Independent System Operator

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC-Maritimes

Control Area ID: NBPwr

Date_Time: 8/14/2003 5:10:00 PM ADT

Year: 2003 **Type:** INT

Utility: New Brunswick Power Co.

CauseCategory: Blackout

Cause: Major Blackout

Event Description_Clean:

On August 14, 2003 at 16:10 the Northeastern United States and portions of Canada blacked out affecting electric systems in the states of Michigan, Ohio, Pennsylvania, New York, New Jersey, Vermont, Massachusetts, and Connecticut, as well as the province of Ontario, Canada. Approximately 61,800 MW of demand was lost as a result of the blackout that affected approximately 50,000,000 customers. A detailed investigation and report will detail the events that occurred during the blackout.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: NYIS

Date_Time: 8/16/2003 12:00:00 PM EDT

Year: 2003 **Type:** PA

Utility: New York Independent System Operator

CauseCategory: Public Appeal

Cause: Public Appeal - Insufficient Capacity

Event Description_Clean:

As a result of the August 14, 2003 Northeastern blackout, on August 16, 2003 at 12:00, the New York ISO called for public appeals to help reduce customer demand while restoration efforts were still under way.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: EES

Date_Time: 8/17/2003 7:48:00 PM CDT

Year: 2003 **Type:** INT

Utility: Entergy

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

On August 17, 2003 at 1948 CDT, system protection removed from service high voltage buses at a generating station because of a failed current transformer (CT). As a result of this incident, system protection then removed several high voltage transmission lines in the immediate vicinity of the initial incident. These subsequent events resulted in the loss of 350 MW of customer load and affected approximately 65,000 customers.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 8/26/2003 9:26:00 PM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Weather

Cause: Weather - Lightning

Event Description_Clean:

n August 26, 2003 at 2126 EDT, system protection removed from service two high voltage transmission lines and multiple generating units at a single generating station due to lightning striking the transmission lines. As a result of this incident approximately 1,075 MW of generation was lost. No customer load was affected by the incident.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 9/4/2003 1:53:00 PM EDT

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Cause Unknown

Event Description_Clean:

On September 4, 2003 at 1353 EDT, system protection removed from service a single high voltage transmission line due to an unknown cause. As a result of this incident, a special protection scheme initiated the tripping of two generating units by single contingency as designed. This resulted in the loss of approximately 600 MW of generation. No customer load was affected by this incident.

2003 - Disturbance Reports - Publi

Region: MAPP

Control Area ID: OTP

Date_Time: 9/12/2003 10:44:00 AM CDT

Year: 2003 **Type:** UO

Utility: Otter Tail Power Company

CauseCategory: SPS Misoperation

Cause: SPS Misoperation - Flashover and SPS misoperation

Event Description_Clean:

On September 12, 2003 at 1044 CDT, a high voltage line switch flashed over on all three phases while it was being opened under load. As a result of this incident, system protection removed from service the involved high voltage transmission line. However, before the transmission line was removed from service, an undervoltage load shedding relay operated on the three phase fault, which resulted in the loss of 22 MW of customer load. Approximately 4,090 customers were affected by this incident.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PJM

Date_Time: 9/15/2003 1:32:00 AM EDT

Year: 2003 **Type:** UO

Utility: PJM Interconnection

CauseCategory: Weather

Cause: Weather - Lightning - Relay Missoperation

Event Description_Clean:

On September 15, 2003 at 0132 EDT, system protection improperly removed from service several high voltage transmission lines due to a lightning strike on one of the involved high voltage transmission lines. As a result of this incident, system protection removed from service approximately 2,100 Mw of generating involving multiple generating units, 875 MW of pump load, and 400 MW of customer load. Approximately 65,000 customers were interrupted because of this incident.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: VAP

Date_Time: 9/18/2003 8:20:00 AM EDT

Year: 2003 **Type:** INT

Utility: Dominion Virginia Power

CauseCategory: Weather

Cause: Weather - Hurricane Isabel

Event Description_Clean:

On September 18, 2003 starting at about 0820 EDT, Hurricane Isabel caused widespread customer interruptions and damaged multiple distribution and transmission lines and facilities. As a result of the damage caused by the hurricane approximately 6,500 MW of customer load was lost affecting more than 1,800,000 customers.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: CPLE

Date_Time: 9/18/2003 11:45:00 AM EDT

Year: 2003 **Type:** INT

Utility: Carolina Power & Light Company - CPLE

CauseCategory: Weather

Cause: Weather - Hurricane Isabel

Event Description_Clean:

On September 18, 2003 starting at about 1145 EDT, Hurricane Isabel caused widespread customer interruptions and damaged multiple distribution and transmission lines and facilities. As a result of the damage caused by the hurricane approximately 1,655 MW of customer load was lost affecting more than 320,000 customers.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PJM

Date_Time: 9/18/2003 12:00:00 PM EDT

Year: 2003 **Type:** INT

Utility: PJM Interconnection

CauseCategory: Weather

Cause: Weather - Hurricane Isabel

Event Description_Clean:

On September 18, 2003 starting at about 1200 EDT, Hurricane Isabel caused widespread customer interruptions and damaged multiple distribution and transmission lines and facilities. As a result of the damage caused by the hurricane approximately 600 MW of customer load was lost affecting more than 120,000 customers.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PPL EU

Date_Time: 9/18/2003 9:00:00 PM EDT

Year: 2003 **Type:** INT

Utility: PPL Electric Utilities

CauseCategory: Weather

Cause: Weather - Hurricane Isabel

Event Description_Clean:

On September 18, 2003 starting at about 2100 EDT, Hurricane Isabel caused widespread customer interruptions and damaged multiple distribution and transmission lines and facilities. As a result of the damage caused by the hurricane approximately 1.300 MW of customer load was lost affecting more than 350,000 customers.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PJM

Date_Time: 9/20/2003 2:12:00 AM EDT

Year: 2003 **Type:** UO

Utility: PJM Interconnection

CauseCategory: Weather

Cause: Weather - High Winds - Salt Contamination

Event Description_Clean:

On September 20, 2003 at 0212 EDT, plant operators manually removed from service 3,300 MW of generation as a result of salt contamination on insulators and high winds as a precautionary measure. Note: This incident will be removed from the DAWG database before it is publicly posted.

2003 - Disturbance Reports - Publi

Region: NPCC-Maritimes

Control Area ID: NSPwr

Date_Time: 9/28/2003 11:58:00 PM ADT

Year: 2003 **Type:** INT

Utility: Nova Scotia Power

CauseCategory: Weather

Cause: Weather - Hurricane Juan

Event Description_Clean:

on 9/28/2003 at 23:58 ADT, Hurricane Juan caused widespread customers outages through the Halifax metropolitan area of Northeastern Nova Scotia. A total of 300,000 customers were affected by these outages.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: NWMT

Date_Time: 10/9/2003 2:52:00 PM MD

Year: 2003 **Type:** UO

Utility: Northwest Energy - Montana

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Cause Unknown

Event Description_Clean:

On 10/09/2003 at 14:24 MDT, multiple generating units were removed from service by system protection upon the loss of two high voltage transmission lines being removed from service by system protection. Cause of the line trips is unknown. Approximately 1800 MW of generation was tripped. No customers were affected as a result of this disturbance.

2003 - Disturbance Reports - Publi

Region: WECC-CAMX

Control Area ID: SDGE

Date_Time: 10/26/2003 1:44:00 AM PST

Year: 2003 **Type:** INT

Utility: San Digeo Gas & Electric Co.

CauseCategory: Fires

Cause: Fires - Brush Fires

Event Description_Clean:

On October 26, 2003 starting at about 0144, system protection removed from service several high voltage transmission lines due to a wide-area brush fire. Because of the numerous line trips, several substations were deenergized. As a result of this event, approximately 90,000 electric customers were without service. Some customers were without electric service for several days due to the extensive damage caused by the brush fire.

2003 - Disturbance Reports - Publi

Region: ECAR

Control Area ID: CIN

Date_Time: 11/12/2003 8:16:00 AM EST

Year: 2003 **Type:** UO

Utility: Cinergy Corporation

CauseCategory: Equipment Failure

Cause: Equipment Failure - EMS Loss

Event Description_Clean:

On 11/12/2003 at approximately 08:16, a control area experienced the loss of EMS for one of its operating companies for 83 minutes. During the event the utility activated emergency response procedures and manned key substations. There was no indication that EMS failure was caused by a cyber attack or threat.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: NYIS

Date_Time: 11/13/2003 7:30:00 AM EST

Year: 2003 **Type:** INT

Utility: New York Independent System Operator

CauseCategory: Weather

Cause: Weather - High Winds

Event Description_Clean:

On November 13, 2003 at about 0730, high winds across most of New York state caused scattered customer outages due to multiple transmission and distribution lines tripping. About 50,280 customers were affected by this wind storm. Winds speeds were reported between 55-70 MPH.

2003 - Disturbance Reports - Publi

Region: SERC

Control Area ID: VAP

Date_Time: 11/13/2003 1:40:00 PM EST

Year: 2003 **Type:** INT

Utility: Dominion Virginia Power

CauseCategory: Weather

Cause: Weather - High Winds

Event Description_Clean:

During the period beginning on November 13, 2003 at 13:40 to November 14, 2003 at approximately 15:41, high winds through areas of northern Virginia caused the loss of electric service to approximately 67,000 customers due to distribution outages.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 11/26/2003 12:03:00 AM EST

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Human Error

Cause: Human Error - Inadvertent Trip

Event Description_Clean:

On 11/26/2003 at 00:03 EST, two generating units were inadvertently tripped causing the loss of 580 MW of generation. There were no electric customers affected by this event.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: ISNE

Date_Time: 12/1/2003 7:18:00 PM EST

Year: 2003 **Type:** INT

Utility: ISO New England Inc.

CauseCategory: Off-Normal Operation

Cause: Off-Normal Operation

Event Description_Clean:

Predisturbance:

During the morning on December 1, 2003, one of three high voltage transmission lines feeding into southeastern area of a control area was manually removed from service on the request of the local fire department, who was fighting a brush fire near the transmission line. A second high voltage transmission line was already removed from service on schedule maintenance. This altered the area configuration by leaving only two high voltage transmission lines feeding into the southeastern area of the control area.

Disturbance:

At 1813 EST on December 1, 2003, a power plant operator manually removed from service a generating unit because of a fire in a flue duct. The removal of this generating unit opened the station ring bus, which was in an abnormal configuration due to another high voltage transmission line being removed from service manually earlier in the day.

At 1821, system protection removed from service the last high voltage transmission line feeding into the southeastern area of the control area causing the electric service interruptions to approximately 300,000 customers. The estimated customer load lost was 630 MW.

By 2011 EST, the control area had restored the transmission system and all customer loads.

2003 - Disturbance Reports - Publi

Region: WECC-NWPP

Control Area ID: PSEI

Date_Time: 12/4/2003 PST

Year: 2003 **Type:** INT

Utility: Puget Sound Energy Transmission

CauseCategory: Weather

Cause: Weather - High Winds

Event Description_Clean:

During the early morning hours of December 4, 2003, severe weather conditions caused high winds throughout an area near off the northwestern portion of the Pacific Ocean. The high winds caused widespread distribution outages that affected approximately 175,000 electric customers. Restoration efforts will take two to three days to complete.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: WEC

Date_Time: 12/4/2003 10:15:00 PM CST

Year: 2003 **Type:** INT

Utility: Wisconsin Energy Corporation

CauseCategory: Sys. Prot.

Cause: Sys. Prot. - Cause Unkown

Event Description_Clean:

On December 4, 2003 starting at about 2215, system protection removed from service several high voltage transmission lines, which caused severe overloading. Due to the overloading, several additional high voltage transmission lines were removed from service by system protection. As a result of this event, about 440 MW of area generation was removed from service by system protection due to frequency swings. In addition, electric service to about 36,000 customers was interrupted. All electric service was restored by 0305 on December 5, 2003. The initial cause of this event is unknown.

2003 - Disturbance Reports - Publi

Region: FRCC

Control Area ID: HST

Date_Time: 12/5/2003 4:49:00 AM EST

Year: 2003 **Type:** INT

Utility: City of Homestead

CauseCategory: Equipment Failure

Cause: Equipment Failure - Sys. Prot. Misoperation

Event Description_Clean:

On December 5, 2003 at 0449 EST, system protection removed from service a high voltage transmission line due to equipment failure. At the same time, system protection removed from service a second high voltage transmission line due to breaker failure, which caused the opening of two transformers. This caused the loss of approximately 22 MW of customer loads. Approximately 16,500 customers lost electric service as a result of this event.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 12/5/2003 6:06:00 AM EST

Year: 2003 **Type:** UO

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Equipment Failure

Cause: Equipment Failure - Malfunction

Event Description_Clean:

On December 5, 2003 at 0606 EST, system protection removed from service a generating unit due to a speed governor problem. This caused the loss of 500 MW of generation. There were no electric customers affected by this event.

2003 - Disturbance Reports - Publi

Region: MAIN

Control Area ID: ENLC

Date_Time: 12/9/2003 1:36:00 PM CST

Year: 2003 **Type:** UO

Utility: Enron - Lincoln Center

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

On December 9, 2003 at 1336 EST, a control center lost a portion of its SCADA control computer due to a transformer failure. There was no significant derogation on the ability to control the system. SCADA was restored to normal by 1712.

2003 - Disturbance Reports - Publi

Region: NPCC

Control Area ID: IMO

Date_Time: 12/22/2003 7:05:00 AM EST

Year: 2003 **Type:** UO

Utility: Ontario - Independent Electricity Market Operator

CauseCategory: Equipment Failure

Cause: Equipment Failure

Event Description_Clean:

On December 22, 2003 at 0705 EST, system protection removed from service a high voltage transmission line and two high voltage autotransformers due to equipment failure. A current transformer on one of the high voltage circuit breakers failed, causing a small oil fire that damaged a portion of the control cables. This degraded the system protection system to a point that the breaker failure scheme was inoperable for one of the high voltage buses. In addition, one of the primary system protection schemes of two redundant schemes was inoperable. Because of the degraded system protection schemes, the control area removed the entire substation from service until repairs to the damaged control cabling could be made. The substation was returned to normal by 1812.

2003 - Disturbance Reports - Publi

Region: MAAC

Control Area ID: PJM

Date_Time: 12/23/2003 9:08:00 PM EST

Year: 2003 **Type:** UO

Utility: PJM Interconnection

CauseCategory: Human Error

Cause: Human Error

Event Description_Clean:

On December 23, 2003 at about 2108, system protection inadvertently removed from service several high voltage transmission lines during the routine restoration of a circuit breaker. As a result of this incident electric service to approximately 80,000 customers was interrupted. All customer services was restored within one hour.

2003 - Disturbance Reports - Publi

Region: NPCC-HQ

Control Area ID: HQT

Date_Time: 12/26/2003 1:12:00 AM EST

Year: 2003 **Type:** INT

Utility: Hydro-Quebec, TransEnergie

CauseCategory: Weather

Cause: Weather

Event Description_Clean:

On December 26, 2003 at about 0112 EST, system protection removed from a high voltage transmission line due to severe weather. At 0136, the line was restored to service. At 0225, system protection again removed this high voltage transmission line from service. At 0703, the line was restored to service after an inspection. During these events, about 630 MW of firm industrial customer load was interrupted.
