

May 1, 2020

**VIA E-MAIL PSCED@KY.GOV**

Kent A. Chandler  
Executive Director  
Public Service Commission  
211 Sower Boulevard  
P.O. Box 615  
Frankfort, KY 40602-0615

Mark R. Overstreet  
(502) 209-1219  
(502) 223-4387 FAX  
moverstreet@stites.com

**RECEIVED**

**MAY 01 2020**

**PUBLIC SERVICE  
COMMISSION**

**RE: Administrative Case No. 345**

Dear Mr. Chandler:

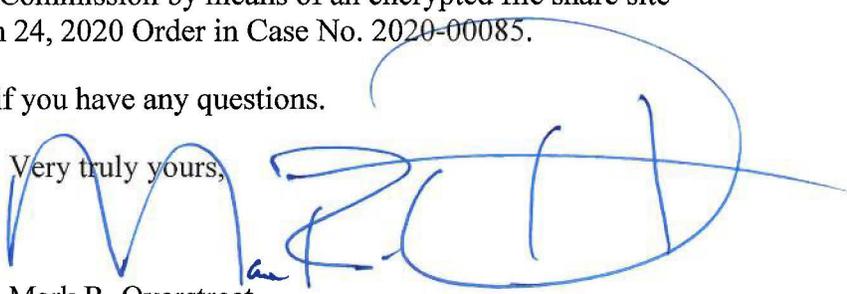
Kentucky Power is making this filing by e-mail transmission in accordance with the Commission's March 16, 2020 Order in Case No. 2020-00085. Accompanying this letter are the following:

- (a) The public version of the AEP East/PJM Emergency Operating Plan Rev. 22. It is being filed Pursuant to the Commission's March 1, 1993 Order in Administrative Case No. 345;
- (b) Kentucky Power Company's motion for confidential treatment for certain portions of the AEP East/PJM Emergency Operating Plan; and
- (c) The affidavit of David R. Ball in support of the motion for confidential treatment.

The confidential portions of the AEP East/PJM Emergency Operating Plan will be separately made available for upload by the Commission by means of an encrypted file share site in accordance with the Commission's March 24, 2020 Order in Case No. 2020-00085.

Please do not hesitate to contact me if you have any questions.

Very truly yours,

  
Mark R. Overstreet

MRO

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Investigation Into Electric Utilities  
Emergency Response Plans

Administrative Case No. 345

\* \* \* \* \*

**MOTION FOR CONFIDENTIAL TREATMENT**

Kentucky Power Company moves the Public Service Commission of Kentucky pursuant to 807 KAR 5:001, Section 13 for an Order granting confidential treatment to the identified confidential information and documents (“Confidential Information”) filed in connection with Kentucky Power's Emergency Operations Plan submitted for its update with the Commission pursuant to the Commission's order in Administrative Case No. 345. This motion is supported by the Affidavit of David R. Ball (“Ball Affidavit”). Mr. Ball's affidavit is attached hereto and incorporated herein by reference.

The Emergency Operations Plan is sensitive as a whole but there are portions of the filing that include Critical Energy Infrastructure Information (“CEII”). This information is declared by the Federal Energy Regulatory Commission (“FERC”) to be exempt from public disclosure. Specifically, Kentucky Power is seeking confidential treatment for the information identified as “Confidential Information” in Paragraph 5 of the Ball Affidavit, as well as the identified portions of pages 13, 14, and 65.

Pursuant to 807 KAR 5:001, Section 13, and the Commission's March 24, 2020 Order in Case No. 2020-00085, Kentucky Power is filing under seal those portions of the Emergency Operations Plan containing confidential information with the confidential portions highlighted in yellow or otherwise indicated as being confidential. Kentucky Power is also filing a public version with the confidential information redacted. Kentucky Power will notify the Commission when it determines the information for which confidential treatment is sought is no longer confidential.

A. The Statutory Standard.

KRS 61.878(1)(m)(1)(f) exempts records from public inspection that would have a reasonable likelihood of threatening the public safety by exposing a vulnerability in preventing, protecting against, mitigating, or responding to a terrorist act, including:

Infrastructure records that expose a vulnerability referred to in this subparagraph through the disclosure of the location, configuration, or security of critical systems, including public utility critical systems. These critical systems shall include but not be limited to information technology, communication, electrical, fire suppression, ventilation, water, wastewater, sewage, and gas systems;

KRS 61.878(1)(k) further exempts "all public records or information the disclosure of which is prohibited by federal law or regulation" from disclosure under the Open Records Act. FERC Rule 18 C.F.R. § 388.113(c) states that CEII:

means specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that:

(i) Relates details about the production, generation, transportation, transmission, or distribution of energy;

(ii) Could be useful to a person in planning an attack on critical infrastructure;

(iii) Is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552; and

(iv) Does not simply give the general location of the critical infrastructure. 18

C.F.R. § 388.112 exempts such information from mandatory disclosure under the Freedom of Information Act.

**1. The Confidential Information in the Emergency Operations Plan.**

The Confidential Information in the Emergency Operations Plan is treated by the Federal Energy Regulatory Commission as CEII and is exempt from public disclosure in accordance with FERC rules. All of the information for which confidential treatment is requested constitutes CEII under the FERC rule. The Confidential Information includes specific engineering, vulnerability, and detailed design information about existing critical infrastructure. The information relates details about the production, generation, transportation, and transmission of energy, and is critical to the safety and security of the region. The Confidential Information does not simply give the general location of critical infrastructure; it is information that could be useful to a person in planning an attack on critical infrastructure. The Confidential Information is exempt from mandatory disclosure under 5 U.S.C. 552.

The specific basis for confidential treatment of the Confidential Information is identified in paragraph 5 of Mr. Ball's affidavit. In addition, the identified table of contents listings on page 13 and the entry for section 5.15 on page 14 provide information regarding the existence of certain plant-specific CEII. The listing for section 8.1.7 on page 14, along with the table on page 65, provide information on emergency communication channel specifics.

Kentucky Power seeks confidential treatment of the Confidential Information in the Emergency Operations Plan for the life of the identified facilities. Once the facilities are retired the information will no longer be CEII.

B. The Identified Information is Generally Recognized As Confidential and Not Generally Known or Readily Ascertainable by Third Parties through Proper Means.

The Confidential Information in the Emergency Operations Plan is highly confidential. The Confidential Information is not available or ascertainable by other parties through normal or proper means. No reasonable amount of independent research could yield this information to other parties. The information reflects the internal planning efforts of AEPSC and Kentucky Power (the "Companies") and information necessary to ensure a safe and reliable management of the transmission system.

Dissemination of the information for which confidential treatment is being requested is restricted by Kentucky Power, its parent, AEP, and its affiliates (including AEPSC). The Company, AEP, and its affiliates take all reasonable measures to prevent its disclosure to the public as well as persons within the Company who do not have a need for the information. The Companies restrict access to the Confidential Information to those employees and representatives of the Companies who have a need to know such information due to their job and management responsibilities. The Companies limit public access to buildings housing the Confidential Information by use of security guards, and persons not employed by the Companies who are allowed past security guards at buildings where Confidential Information is kept are not permitted to walk within such buildings without an escort. The Companies' files containing the Confidential Information are maintained separately from the Companies' general records and access to those files is restricted. Within the Companies, access to this information has been and will continue to be disclosed only to those employees and representatives of the Companies who have a need to know about such information

due to their job and management responsibilities. Outside the Companies, this information is only provided to certain persons who have a legitimate need to review the information.

C. The Identified Information Is Required To Be Disclosed To An Agency.

The identified information is by the terms of the Commission's Order required to be disclosed to the Commission. The Commission is a "public agency" as that term is defined at KRS 61.870(1). Any filing should be subject to a confidentiality order and any party requesting such information should be required to enter into an appropriate confidentiality agreement.

WHEREFORE, Kentucky Power Company respectfully requests the Commission to enter an Order:

1. According confidential status to and withholding from public inspection the identified information; and
2. Granting Kentucky Power Company all other relief to which it may appear entitled.

Respectfully submitted,



Mark R. Overstreet  
STITES & HARBISON PLLC  
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P. O. Box 634  
Frankfort, Kentucky 40602-0634  
Telephone: (502) 223-3477  
Facsimile: (502) 773-8349  
[moverstreet@stites.com](mailto:moverstreet@stites.com)

COUNSEL FOR KENTUCKY POWER COMPANY



## DBall\_Kentucky\_Power\_EOP Confidentiality\_Affidavit 4.28.20.pdf

DocVerify ID: D2988205-3CB5-4C27-8EF8-367D5A0993CA  
 Created: April 28, 2020 13:04:32 -5:00  
 Pages: 5  
 Remote Notary: Yes / State: OH

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### E-Signature Summary

**E-Signature 1: David R. Ball (DRB)**

April 29, 2020 11:40:25 -5:00 [1FE35717AA4E] [161.235.221.83]  
 drball@aep.com (Principal) (ID Verified)

**E-Signature Notary: Dean M. Hindenlang (DMH)**

April 29, 2020 11:40:25 -5:00 [13029871CF62] [74.141.170.55]  
 dhindenlang@mac.com  
 I, Dean M. Hindenlang, did witness the participants named above electronically sign this document.



**AFFIDAVIT OF DAVID R. BALL**

David R. Ball, first being duly sworn, deposes and states:

1. I am employed by American Electric Power Service Corporation (“AEPSC”). AEPSC is a wholly-owned subsidiary of American Electric Power Company, Inc. (AEP) and is an affiliate of Kentucky Power Company (the “Companies”). I am responsible for support of the efficient and reliable operation and coordination of the AEP subsidiaries’ transmission network in PJM and SPP; for the development of operational standards, and system studies, normal and emergency operating plans and procedures. I also assist with the development and delivery of training in support of system control center and dispatching activities and in support of operations engineering practices; with providing operational input to the transmission asset management process; with Transmission Operations compliance with all NERC and Regional Reliability Council operational and reliability requirements; with updating the annual revision and improvement of the AEP Transmission Emergency Operating Plan and ensuring the Plan conforms to the latest NERC requirements. I have also been involved in several NERC Standards Authorization Request and Standard Drafting Teams.

2. I am of the age of majority and competent to make this Affidavit. The statements in this Affidavit are based on my personal knowledge or knowledge gained through my investigation with other AEPSC and Kentucky Power employees of the matters set forth in this Affidavit.

**Description of the Confidential Information for  
Which Protection is Sought**

3. Kentucky Power is requesting that certain confidential Critical Energy Infrastructure Information (“CEII”) included in Kentucky Power’s Emergency Operation Plan be exempted from public disclosure pursuant to KRS 61.878(1)(k) and KRS 61.878(1)(m).

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4. The Confidential Information contained in this emergency response plan (as indicated in the table below) is treated by the Federal Energy Regulatory Commission as CEII and is exempt from public disclosure in accordance with FERC rules. 18 C.F.R. § 388.113(c). All of the information for which confidential treatment is requested constitutes CEII under the FERC rule. The CEII includes specific engineering, vulnerability, and detailed design information about existing critical infrastructure. The information relates details about the production, generation, transportation, and transmission of energy. The CEII is critical to the safety and security of the region. The information does not simply give the general location of critical infrastructure; it is information that could be useful to a person in planning an attack on critical infrastructure. The CEII is exempt from mandatory disclosure under 5 U.S.C. 552.

5. More specifically, Kentucky Power seeks confidential treatment for engineering, vulnerability, and detailed design information about existing critical infrastructure related to the generation and transmission system of the AEP subsidiaries.. The following table details the nature of the information and how it relates to the critical nature of the information in emergency situations.

Section(s)/Pg #(s)	Confidential Information
Executive Team / Management Group/9-11  3.4/23-31  3.5.1/33  3.6/34	Contact names and information of personnel involved in the emergency response operations. Public disclosure of this list would provide persons seeking to harm the generation and transmission system a list of individuals both within Kentucky Power and APESC and contacts at other companies who are responsible for securing the system and ensuring its continued operation and could be used to interfere with the performance of their duties.
5.3.1/49  6.2/58  6.4/59  6.6.1/60	Internal web address/documentation location. Public disclosure of this information would provide persons seeking to harm the generation and transmission system potential access to AEP's intranet/document storage locations.

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Section(s)/Pg #(s)	Confidential Information
5.4/ 50	Specific description of units equipped with a Remedial Action Scheme (RAS).
5.15/54	Specific description of units equipped with a certain power stabilizer.
6.6.5/64 8.1.6/67-68	Communication channel specifics. Public disclosure of this information would provide persons seeking to harm the generation and transmission system a list of individuals both within Kentucky Power and APESC and contacts at other companies who are responsible for securing the system and ensuring its continued operation and could be used to interfere with the performance of their duties.
10.0/70, 72	Internal web address/documentation location. Public disclosure of this information would provide persons seeking to harm the generation and transmission system potential access to AEP's intranet/document storage locations.
10.0/71	MALS display screenshots. Public disclosure of this information would provide persons seeking to harm the generation and transmission system potential access to AEP's intranet/document storage locations.

**The Information Contained in Confidential Information is Critical Energy Infrastructure Information and is Not Generally Known, Readily Ascertainable by Proper Means by Other Persons**

6. The CEII is not available or ascertainable by other parties through normal or proper means. No reasonable amount of independent research could yield this information to other parties. The information reflects the internal planning efforts of AEPSC and Kentucky Power (the "Companies") and information necessary to ensure a safe and reliable management of the transmission system.

**The Information is the Subject of Reasonable Efforts to Maintain Its Secrecy**

7. The Confidential Information has been the subject of reasonable efforts to maintain its secrecy. The Companies restrict access to the CEII to those employees and representatives of the Companies who have a need to know such information due to their job and management responsibilities. The Companies limit public access to buildings housing the CEII by use of security guards. Persons not employed by the Companies who are allowed past security guards at buildings where Confidential Information is kept are not permitted to walk

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within such buildings without an escort. The Companies' files containing the Confidential Information are maintained separately from the Companies' general records and access to those files is restricted. Within the Companies, access to this information has been and will continue to be disclosed only to those employees and representatives of the Companies who have a need to know about such information due to their job and management responsibilities. Outside the Companies, this information is only provided to certain persons who have a legitimate need to review the information.

Further the Affiant sayeth naught.

Dated: 04/29/2020

  
Signed on 2020/04/29 11:40:25 -5:00

David R. Ball

STATE OF OHIO            )  
  ) SS:  
COUNTY OF FRANKLIN    )

David R. Ball appeared before me, a Notary Public in and for this County and State, and swore that the foregoing statements are true.

DEAN M. HINDENLANG  
\_\_\_\_\_  
Printed

  
Signed on 2020/04/29 08:40:25 PST

04/29/2020

Signature

My Commission Expires:  
DECEMBER 19, 2022



My County of Residence:  
FRANKL  
IN



**JURAT CERTIFICATE**

State of Ohio, County of Franklin

Sworn to or affirmed and subscribed before me by DAVID R. BALL (name of person making oath/affirmation) on this date of 04/29/2020 (date).

(Notary Seal)



04/29/2020

Signature of Notary Public – State of Ohio  
Dean M. Hindenlang, Notary Public

My Commission Expires: December 19, 2022  
Commission No.: 2017-RE-686822

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## Transmission Operations

# AEP East/PJM Emergency Operating Plan

Effective Date: 4/15/2020

Supersedes *AEP East/PJM Emergency Operating Plan Rev. 21.0*

Description: Plan to maintain reliable power system operation associated with the bulk power supply system. The document focuses on preventing major power outages of wide extent involving generating plants, transmission lines, and bulk electric system substations who collectively deliver the power to major points of distribution.

**Note:** Printed copies of this document are uncontrolled and may be obsolete. This document has been prepared by, and is the property of, American Electric Power Company, Inc., is intended for AEP use only, is not to be used for any purpose detrimental to AEP's interest, and is not to be furnished to, or copied or reproduced by, parties not affiliated with the AEP System without the express written consent of AEP, and is to be returned upon request.

## Document Control

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### Preparation

Prepared By:	Title	Date
Bob Valasek	Trans Technical Writer Sr, TOps Reliability Support	4/7/2020

### Review

Reviewed By:	Title	Initial	Date
Michael R. Richardson	Engineer Staff, Trans Operations Engineering		
Tyler Barnett	Planning & Engineering Supv, Trans Operations Engineering		
Christopher R. Shaffer	Trans Oprs Reliability Mgr, Trans Operation Reliability		
Bruce Samblanet	NERC Compliance Spec Prin, TOps Reliability Support		
Logan D. Lacy	Trans Dispatching Supv, Trans Dispatch Columbus		
William B. Amos JR.	Trans Dispatching Supv, Trans Dispatch Roanoke		
Matthew S. Veith	Operations Engrg Mgr, Trans Operations Engineering		

### Approval

Approved By:	Title	Signature	Date
Dennis R. Sauriol	Dir Trans RealTime Reliability, Trans Operation Reliability		



## Implementation

<b>Effective Date</b>	4/15/2020
<b>Review Frequency</b>	Annually
<b>Retention Period</b>	Six Years

## Revision History

<b>Rev.</b>	<b>Description of Change(s)</b>	<b>By</b>	<b>Date</b>
1.0	Annual Review		June 1999
2.0	Annual Review		February 2001
3.0	Annual Review		May 2001
3.1	Minor Revisions		June 2001
4.0	Annual Review		June 2002
5.0	Annual Review		June 2003
6.0	Annual Review		March 2004
7.0	Major Revisions		October 2004
8.0	Annual Review		June 2005
9.0	Annual Review		February 2006
9.1	Minor Revisions		March 2006
9.2	Minor Revisions		April 2006
9.3	Minor Revisions		September 2006
10.0	Annual Review		March 2007
10.1	<ol style="list-style-type: none"> <li>1. Updated Implementation with some revised names and corrected some phone numbers.</li> <li>2. Updated the following Sections based on recommendations from the NERC Readiness and RFC audit teams. Section I, II, III, V, VIII, X</li> </ol>		May 2007
11.0	Annual Review		April 2008

Rev.	Description of Change(s)	By	Date
11.1	Minor edits, and classification of document as AEP Confidential Special Handling		August 2008
12.0	Annual Review		April 2009
12.1	Added Document Control, updated Section VI-Rockport SPS and Section VIII-Black Start test dates		August 2009
12.2	Updated Implementation phone numbers Updated Section VIII-Black Start - AEPW/SPP test dates and backup agreement with METC for Cook Updated Appendix VII Emergency Contact phone numbers		September 2009
13.0	Annual Review <ul style="list-style-type: none"> <li>• Implementation names/phone numbers</li> <li>• Section III - Capacity Deficiency Program consistent with PJM</li> <li>• Section V - Fuel Limitations added reference to SPP Criteria, update Figure V-1</li> <li>• Section VI – Transmission Emergency Procedures SPS, UVLS, PJM procedures, PSS updates</li> <li>• Section IX -DOE and NERC Reporting clarified reporting times</li> <li>• Section X – Emergency Communications phone numbers</li> <li>• Section XI – Training hours</li> <li>• Appendix III – Under Frequency Guidelines</li> <li>• Appendix V – Manual Load Shedding Guidelines loads</li> <li>• Appendix VII Emergency Contact phone numbers</li> </ul>		April 2010
13.1	Updated <ol style="list-style-type: none"> <li>1. Section III Capacity Deficiency Program <ul style="list-style-type: none"> <li>• Minor edits to PJM portion</li> </ul> </li> <li>2. Section VI Transmission Emergency Procedures <ul style="list-style-type: none"> <li>• Indiana – Rockport Plant Special Protection System</li> </ul> </li> <li>3. Section VIII System Restoration <ul style="list-style-type: none"> <li>• Unit Test dates</li> </ul> </li> </ol>		December 2010



Rev.	Description of Change(s)	By	Date
	<ul style="list-style-type: none"> <li>• TDC Name changes</li> <li>• System Restoration dB 4.) Appendix VII</li> <li>• AEP internal contacts due to reorganization</li> </ul>		
14.0	Annual Review		June 2011
15.0	Annual Review. Correct Date typo		June 2012
15.1	Update <ul style="list-style-type: none"> <li>• Section III – Load updates Section VI – Load shedding updates</li> <li>• Section VIII – ALR test dates updates</li> <li>• Restoration frequency range</li> <li>• Update</li> <li>• Section IX – NERC form update Section X – Satellite phone # update</li> <li>• Appendix VI – Added PER- 003-1</li> <li>• Appendix VII – Added new</li> <li>• contact</li> </ul>		December 2012
16.0	Annual Review <ul style="list-style-type: none"> <li>• Section III – Update PJM and SPP sections to be consistent with respective RC requirements</li> <li>• Section V – Update reference to NERC standards, PJM manuals, and SPP Criteria.</li> <li>• Section VI – Updated PJM manual references SPP Criteria references.</li> <li>• SPP IROL Relief Guide dated 06/28/13</li> <li>• Rockport Operating Procedure</li> <li>• Columbus Southern Under Voltage Load Shed Scheme</li> <li>• Added Plant Fault Duty Procedures</li> <li>• Operating in an Unknown State</li> <li>• Section VIII – This section contains highlights of the AEP System Restoration Plans approved by PJM and SPP RC. Refer to the approved plans on TOps Sharepoint for additional information.</li> <li>• Section IX – Update NERC fax</li> </ul>		August 2013

Rev.	Description of Change(s)	By	Date
	<ul style="list-style-type: none"> <li>• #, email address, and links to NERC’s reorganized web site.</li> <li>• Section X – Update NERC, PJM manual references, TDC communication references.</li> <li>• Section XI – Update System Operator Training objectives</li> </ul>		
17.0	<p>Annual review</p> <ul style="list-style-type: none"> <li>• Section III – Update PJM and SPP sections to be consistent with respective RC requirements</li> <li>• Section V – Update SPP section to be consistent with SPP Emergency Operating Plan</li> <li>• Section VI – Update to reflect AEP / PJM / SPP Emergency Procedures</li> <li>• Section VIII - This section contains highlights of the AEP System Restoration Plans approved by PJM and SPP RC. Refer to the approved plans on TOps Sharepoint for additional information.</li> <li>• Section IX – Updated to be consistent with AEP Reporting Operating Plan. Sorted Attachment 1 table by reporting time.</li> <li>• Appendix II – Updated high voltage limits in Table AIII-4 to reflect Mike Skidmore’s recommendations.</li> <li>• Appendix III – Updated AEP East, PSO, SWEPCO peak load tables.</li> <li>• Appendix IV – Update load relief number</li> <li>• Appendix V – Update Tables AV-1, AV-2, PSO, and SWEPCO tables</li> <li>• Appendix VI – Added NERC IRO-001-1.1 R8 and IRO-004-2 R1</li> <li>• Appendix VII – Updated contact list and associated phone numbers</li> </ul>		September 2014
18.0	<p>Annual Review</p> <ul style="list-style-type: none"> <li>• Implementation – Update contact information</li> <li>• Section III – Update PJM and SPP sections to be consistent with respective RC requirements. Updated load management, unit retirements.</li> <li>• Section IV – Updated to reflect unit retirements.</li> </ul>		November 2015



Rev.	Description of Change(s)	By	Date
	<ul style="list-style-type: none"> <li>• Section V – Updated to reflect changes in PJM and SPP requirements.</li> <li>• Section VI – Updated to reflect changes in PJM m03, m13, m14, m37, and SPP Emergency Operating Plan.</li> <li>• Emergency Actions dealing with voltage control.</li> <li>• PCLLRW and PCAP additions. Updated UVLS schemes</li> <li>• Updated Plant Fault Duty Procedures.</li> <li>• Section VII – Updated to align with the AEP Emergency Response Plan.</li> <li>• Section VIII – Refers the reader to the Reliability Coordinator approved system restoration plan for the PJM / SPP areas.</li> <li>• Section X – Updated to reflect NERC COM standard, PJM M01, and SPP Criteria 10 changes. Updated phone numbers.</li> <li>• Section XI – Updated to reflect NERC PER-005 requirements.</li> <li>• Appendix V – Updated load shed MW.</li> <li>• Appendix VI – Incorporates updated AEP Operator to Act Policy document.</li> <li>• Appendix VII – Updated internal / external contacts</li> </ul>		
19.0	<p>Annual Review</p> <ul style="list-style-type: none"> <li>• Updated contacts in Implementation section</li> <li>• Section II – Updated policies and guidelines by referencing Appendix VI AEP’s Operator Authority to Act Policy</li> <li>• Section III – Updated to line up with PJM and SPP BA plans.</li> <li>• Section VI – Updated to reflect PJM / SPP manual updates, AEP procedure updates, and NERC standards.</li> <li>• Section IX – Event Reporting Operating Plan updated</li> <li>• Section X – Updated to reflect PJM / SPP manual updates, and NERC COM 001-2.1.</li> <li>• Appendix V – Updated load shed MW.</li> <li>• Appendix VI – Incorporates updated AEP Operator to Act Policy document.</li> <li>• Appendix VII – Updated internal / external contacts</li> </ul>		November 2016

Rev.	Description of Change(s)	By	Date
20.0	<p>Annual Review</p> <ul style="list-style-type: none"> <li>• Implementation Section- Updated contacts</li> <li>• Section II- Updated policies to reflect updates in NERC Standards</li> <li>• Section III- Streamlined by referencing the PJM/SPP detailed capacity deficiency procedures. Kept the table highlighting AEP's response to the RC requests. Removed the EEA description which is in the NERC standards.</li> <li>• Section IV – Abnormal Frequency, Removed Gavin</li> <li>• Section V – Fuel</li> <li>• TOP is not responsible for fuel per NERC EOP 011.</li> <li>• Section VI –Transmission Emergency Procedures Updated to reflect PJM / SPP manual references, AEP procedure updates, and NERC standards.</li> <li>• Section VIII – References AEP Restoration Plans approved by the Reliability Coordinators</li> <li>• Section IX – Incorporated AEP Event</li> <li>• Reporting rev5 document.</li> <li>• Section X –Emergency Communications</li> <li>• Updated PJM /SPP manual references, AEP satellite phones</li> <li>• Section XI – Updated training requirements.</li> <li>• Appendix V – Updated load shed MW. Screen dumps of AEP East ADX</li> <li>• Appendix VII – Updated internal / external contacts</li> </ul>		January 2018
21.0	<p>Updated format to current standard. Links to external sources References to internal documentation</p>	Mike Richardson	1/15/2019
22.0	Annual Review	Mike Richardson	4/15/2020



## Executive Team

Group	Team Member(s)
Transmission	Scott Moore, [REDACTED] Cell phone [REDACTED] Wade Smith, [REDACTED] Cell phone [REDACTED]
Regulated Commercial Operations – Market Ops & Fuels	Julie Sherwood, [REDACTED], Cell phone [REDACTED]
Energy Supply (competitive)	Charles E. Zebula [REDACTED], Cell phone [REDACTED]
Generation	Paul Chodak [REDACTED], Cell phone [REDACTED]
AEP Utilities	Lisa Barton [REDACTED], Cell phone [REDACTED]
Corporate Communication	Dale E Heydlauff [REDACTED], Cell phone [REDACTED]
Customer Solutions Center	Robert L Cheripko [REDACTED], Cell phone [REDACTED]
Environmental Services	Gary O Spitznogle [REDACTED], Cell phone [REDACTED]

The Management Group personnel listed below are responsible for keeping the Executive Team informed and up to date as well as keeping their organizations informed of all the actions taking place. The best practice is for Transmission Operations and Corporate Communications to coordinate from the System Control Center (SCC) location. Other parties can operate in the SCC or coordinate their efforts by telephone and/or 800 MHz radios.

In an emergency situation, the FERC rules allow for temporary suspension of the affiliate restrictions and standards of conduct in order to preserve the reliability of the grid. A notice is posted on the Open Access Same-Time Information system (OASIS) that states: “AEP is in an emergency situation and the separation between the Transmission Reliability and Market functions has been temporarily suspended.”

The OASIS posting is on the AEP FERC Standards of Conduct for Transmission Providers. See [www.aep.com](http://www.aep.com) > About Us > Required Internet Postings. Ethics and Compliance coordinate the postings from Transmission. Contact Ethics and Compliance at 8-200-6226 or 614-716- 6226.

## Management Group

Groups who are responsible for directing operational implementations of the Emergency Operating Plan (EOP):

Group	Contact(s)
Transmission Operations	Matthew Veith [REDACTED], Cell [REDACTED] Dennis Sauriol [REDACTED], Cell [REDACTED] David Ball [REDACTED], Cell [REDACTED]
Regulated Market Operations	David G Erickson [REDACTED], Cell [REDACTED] Tom Presthus [REDACTED], Cell [REDACTED]
Environmental Services	Scott Weaver [REDACTED], Cell [REDACTED]
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The Management Group above provides guidance to the System Control Center regarding implementation of provisions of the EOP, but the final decision rests with the System Control Center Operator per NERC Standards and NERC Certification requirements. The Management Group also assists with external communication to such agencies as the Public Utilities Commissions, media outlets, Homeland Security, state emergency management centers, the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), etc.

## Table of Contents

---

Document Control .....	2
Preparation .....	2
Review .....	2
Approval .....	2
Implementation .....	3
Revision History .....	3
Executive Team .....	9
Management Group .....	10
Table of Contents .....	12
Table of Figures .....	15
Purpose .....	17
Procedure for Implementing Capacity Deficiency of the Emergency Operating Plan .....	17
1.0 Introduction .....	17
2.0 Policies and Guidelines .....	18
References .....	19
Terms and Definitions .....	20
3.0 Capacity Deficiency Program .....	21
3.1 Purpose .....	21
3.2 Criteria .....	21
3.3 AEP East/PJM Procedures .....	22
3.3.1 Overview .....	22
3.4 Capacity Deficiency Summary Table .....	23
3.5 Severe Weather Conditions .....	33
3.5.1 Cold Weather Alert .....	33
SCC Actions .....	33
Other Actions .....	33
3.6 Hot Weather Alert .....	34
SCC Actions .....	34
Other Actions .....	34
AEP East/PJM .....	35
3.7 Emergency Messages from American Electric Power to the Public .....	38



4.0 Procedures during Abnormal System Frequency..... 40

4.1 Under-Frequency Program..... 40

4.1.1 Procedures..... 40

4.2 Automatic Load Shedding Program Specifications ..... 40

4.3 Isolation of Coal-Fired Steam Turbine Generation Units..... 42

4.4 Turbine Off-Frequency Operation ..... 43

4.4.1 AEP PJM Turbine Generator Units ..... 43

ABB Turbine Generator Units ..... 43

General Electric Turbine Generator Units ..... 44

Westinghouse Turbine Generator Units..... 44

5.0 Transmission Emergency Procedures ..... 45

5.1 SOL/IROL Definitions..... 45

5.1.1 System Operating Limit..... 45

5.1.2 Interconnected Reliability Operating Limit ..... 45

5.2 Introduction and Conditions..... 46

5.3 Actions for Transmission System Emergencies..... 47

5.3.1 Emergency Actions..... 47

5.4 AEP/PJM – [REDACTED]..... 50

5.4.1 System Description – [REDACTED]..... 50

5.5 Plant Fault Duty Procedures ..... 50

5.6 Geomagnetic Disturbance Operating Procedure..... 50

5.6.1 Highlights of Procedure..... 50

5.7 NERC Transmission Loading Relief Procedure ..... 51

5.8 Additional PJM Emergency Procedures..... 51

5.8.1 PJM – Thermal Operating Guides..... 51

5.9 Voltage Limit Violations ..... 51

5.10 Heavy Load, Low Voltage Conditions..... 51

5.10.1 Low Voltage Alert..... 51

5.10.2 Heavy Load Voltage Schedule Warning..... 52

5.10.3 Heavy Load Voltage Schedule Action ..... 52

5.11 Light Load, High Voltage Conditions ..... 52

5.11.1 Minimum Generation Advisory and Minimum Generation Alert..... 52

5.11.2 Minimum Generation Emergency Declaration..... 53

5.11.3 Minimum Generation Event..... 53

5.11.4 High System Voltage Action ..... 53

5.12 Post-Contingency Local Load Relief Warning ..... 53

5.13 Post-Contingency Load Dump Limit Exceedance Analysis ..... 54

5.14 PJM Reactive Reserve Check ..... 54

5.15 Units Equipped with [REDACTED] ..... 54

5.16 Conservative Operation..... 54

5.17 Emergency Messages ..... 55

6.0 Major Storm Restoration ..... 58

6.1 Introduction..... 58

6.2 AEP Emergency Response Plan – Overview..... 58

6.3 AEP ERP – Declaration of Transmission Emergency ..... 59

6.4 AEP ERP – Transmission Operations Overview ..... 59

6.5 AEP ERP – Training Personnel..... 59

6.6 Storm Restoration Plan..... 59

6.6.1 Restoration Priority ..... 60

6.6.2 Staffing ..... 60

6.6.3 Communications ..... 61

6.6.4 Storm Organization Responsibilities..... 62

6.6.5 Storm Emergency Communications ..... 64

7.0 Introduction DOE and NERC Event Reporting Requirements..... 65

8.0 Emergency Communications ..... 65

8.1 Types of Communication Systems..... 66

8.1.1 800 Mhz Radio and Fiber Optics System ..... 66

8.1.2 Audinet System ..... 66

8.1.3 TDC to Plant Communication ..... 66

8.1.4 Satellite Communications..... 66

8.1.5 SCADA Communications..... 66

8.1.6 AEP Satellite Telephones..... 67

8.1.7 [REDACTED] ..... 67

8.2 Decision Making/Collaboration ..... 67

8.3 Communication Failures..... 68



8.4 Testing ..... 68

9.0 Training Requirements..... 68

    9.1 System Operator Training..... 69

    9.2 Requirements ..... 69

10.0 Appendix A: AEP PJM Manual Load Shedding Guidelines ..... 69

    10.1 Load Shedding Criteria..... 70

        10.1.1 Priority ..... 70

        10.1.2 Procedure..... 71

**Table of Figures**

---

Table 3-1. Capacity Deficiency Summary AEP/PJM..... 32

Table 3-2. AEP System – Details of Emergency Capacity Resources Extra Load Capability..... 35

Table 3-3. AEP System – Details of Emergency Capacity Resources Curtailment of Generating Station Use ..... 35

Figure 3-1. Capacity Deficiency Warning Notifications ..... 36

Figure 3-2. Capacity Deficiency Action Notifications ..... 37

Figure 3-3. Voluntary Load Curtailment Request to the Public ..... 38

Figure 3-4. Mandatory Load Curtailment Initiation Announcement to the Public ..... 38

Figure 3-5. Mandatory Load Curtailment Information Statement to the Public..... 39

Figure 3-6. Capacity Deficiency Termination Statement to the Public ..... 39

Table 4-1 . Restoration Blocks – Time Delay Settings ..... 42

Table 4-2. Recommendations for ABB Turbine Generators..... 44

Table 4-3 . Recommendations for Westinghouse Turbine Generators 18, 20, 23, 25, and 26-Inch LP Ends and 32-Inch Ruggedized LP Ends ..... 44

Table 4-4. Recommendations for Westinghouse Turbine Generators 28.5 through 44-Inch LP Ends..... 45

Figure 5-1. Operating Limit Timeline ..... 46

Figure 5-2. Voluntary Load Curtailment Initiation Announcement to the Public ..... 56

Figure 5-3. Mandatory Load Curtailment Initiation Announcement to the Public ..... 57

Figure 5-4. Mandatory Load Curtailment Information Statement to the Public..... 57

Figure 5-5. Transmission Emergency Termination Statement to the Public..... 57

Figure 6-1. Initial Notifications for Storm Restoration Plan Flow Chart ..... 61

Table 6-1. Storm Organizational Responsibilities Matrix ..... 64

Figure 6-2. Storm Channels ..... 65

Figure 8-1. Emergency Communication Pathways ..... 65



Table 8-1. AEP/PJM 800 Mhz Talk Group .....**Error! Bookmark not defined.**

Figure 10-1. Example of MALS Display..... 69

Figure 10-2. ALSCA Display ..... 69

Table 10-1. Peak Non-Coincidental MW Available on MALS for Calendar Year 2017..... 70

Table 10-2. Feeder Prioritization ..... 70

Table 10-3. Load Definitions ..... 71



## Purpose

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If the AEP/PJM footprint experiences a Capacity Deficiency Event which requires implementation of our Capacity Deficiency plan or if a portion of the PJM region experiences a wide-spread area outage or becomes separated from the interconnected system, the System Control Center (SCC) and/or Commercial Operations – Market Operations (MO) contacts their Executive Team representative, explains the system emergency, and begins taking actions to implement the Emergency Operating Plan.

PJM is the Balancing Authority for AEP East/PJM. The following procedures help clarify Section 3.0, *Capacity Deficiency*, of our plan.

## Procedure for Implementing Capacity Deficiency of the Emergency Operating Plan

---

For the AEP/PJM footprint, PJM is responsible for monitoring the operation of the PJM RTO and declaring the existence of a capacity deficiency and for directing the operations of the PJM Members as necessary to manage, alleviate, or end a capacity emergency event.

Whenever PJM declares a capacity alert/warning/action for the AEP/PJM footprint, the System Control Center contacts their Executive Team representative as well as the Market Operations representative who are responsible for notifying their Executive Team representative.

The regional BA (PJM) decides when to implement the provisions of EOP Section 3.0, *Capacity Deficiency*, and the SCC makes notifications as required.

### 1.0 Introduction

---

This plan is aimed at maintaining reliable power system operation associated with the bulk electric system. The main focus is on preventing major power outages of wide extent involving generating plants, transmission lines, and bulk electric system substations who collectively deliver the power to major points of distribution.

While localized power interruptions are considered beyond the scope of this plan, it is important to recognize that some of the plan's features are of benefit in those situations.

The Emergency Operating Plan is primarily directed toward providing concepts, recommendations for facilities (communications, displays, alarms, etc.) and basic data which, together with trained personnel, will permit a sound approach to the handling of any emergency situation that may arise. This approach keeps the plan dynamic and also avoids the impractical approach of trying to define every condition that may arise.

Should conditions arise that are beyond any reasonable expectations, including multiple outages caused by either weather or equipment failures, refer to the NERC Reliability Coordinator approved System Restoration Plan. The System Restoration Plan contains general procedures for restoring the system as quickly as possible. Every effort is made to avoid the need to use restoration procedures.

DOE form OE-417, which is mandatory pursuant to Section 13(b) of the Federal Energy Administration Act of 1974 (Public Law 93-275), places an added emphasis on the need for formal procedures to follow in emergencies related to the bulk electric system. The AEP Event Reporting Operating Plan on TOps ShareNow summarizes the NERC Standard EOP-004-3 reporting requirements and describes the program to address those requirements.

Personnel receiving copies of this plan need to become familiar with its contents; furthermore, all employees who are involved in the various procedures need to have sufficient training to perform the intended tasks.

AEP considers all elements of EOP-011, EOP-005-3, PJM Manuals, MISO Operating Guides and Operating Procedures, in the development of AEP's Emergency Operating Plan.

AEP provides the AEP Emergency Operating Plan to neighboring entities per RC requirements. Information that is designated as FERC Critical Energy Infrastructure Information (CEII) is removed from the Plan unless a signed confidentiality agreement is returned by the neighboring entity.

This plan is updated annually. In accordance with NERC EOP-011 R1, AEP submits the plan(s) to the Reliability Coordinator for review.

- Section 7 of PJM Manual 13 states the plan(s) need to be submitted to PJM Reliability Coordinator using the email address [EOP-011forms@pjm.com](mailto:EOP-011forms@pjm.com).
- MISO requires submitting a completed *TOP and BA Emergency Operations Plan Submittal SO-P-EOP-00-008* worksheet to [RTOpsCompliance@misoenergy.org](mailto:RTOpsCompliance@misoenergy.org).

## 2.0 Policies and Guidelines

---

Reliability Entities must operate power systems within limits that ensure adequate generation and transmission capacity to avoid cascading for actual or N-1 contingency overloads. While power system load grows more or less on a continual basis, transmission and generation equipment is added in finite blocks. This method results in operating margins that not only are changing but may result in constraints that alternate in severity both in generation and transmission.

In developing a set of operating limits for the AEP System, it is important to do so within a general framework to ensure that the operating objectives are met. Accordingly, a set of general guidelines is presented below.

1. AEP's primary focus in carrying out these emergency procedures is clearly stated in our Environment, Safety & Health Philosophy:  
"No aspect of operations is more important than the health and safety of people. Our customers' needs are met in harmony with environmental protection."
2. Each Transmission Operator has the responsibility and clear decision-making authority to take whatever actions are needed to ensure the reliability of its area and shall exercise specific authority to alleviate operating emergencies, including the shedding of firm load.
3. The integrity of the transmission system will be maintained at all times without planned internal separation. Actual thermal overloads or voltage constraints must be alleviated immediately using identified transmission procedures.
4. Responsibilities and authorities of the AEP Transmission System Control Center Reliability Coordinators and Transmission Dispatchers in performing various actions to alleviate operating Emergencies and/or ensure stable and reliable operation of the AEP transmission system are outlined in AEP's *TOPs Operator Authority to Act Procedure*. Compliance with all Operating Instructions as outlined in the procedure is required unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements. Maximum reasonable assistance is given to adjacent systems experiencing difficulty. However, such assistance will be terminated, without opening interconnection circuits if possible, when the reliable operation of the AEP System is impaired. This practice assumes the following:



- a. The requesting Transmission Operator has implemented its comparable Emergency procedures.
  - b. The request is consistent with AEP’s Operator Authority to Act Procedure.
- 5. The AEP System should be operated so that the occurrence of any single contingency (circuit, transformer, or unit) does not result in instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the Interconnection. The single contingency analysis is geared to the current state of the System, which reflects maintenance and forced outage events as they occur. Operating Plans shall be developed to ensure prompt action to prevent or mitigate identified adverse System impacts. Operation of the AEP System also takes into consideration any effects on facilities outside of the AEP System. Other systems should be advised of known conditions that may present a hazard to their operation or could result in an Emergency. Events and conditions affecting regional or national bulk power electric system reliability must be reported to the U.S. Department of Energy (DOE) and NERC.
- 6. The principles of sound interconnected operation are maintained when the AEP System experiences a generation load imbalance by following Operating Instructions issued by the applicable Balancing Authority unless it cannot be physically implemented or it would violate safety, equipment, regulatory, or statutory requirements.
- 7. Generating plant, substation, and transmission equipment maintenance and testing should be held to a minimum prior to and during System Emergency conditions. When such conditions are expected to exist, the System Control Center (SCC) notifies each Transmission Dispatching Center (TDC) and Market Operations (MO), so any work that could jeopardize generation or transmission capabilities can be postponed.
- 8. The System Control Center Reliability Coordinator (SCCRC) shall notify the Reliability Coordinator (RC) of current and projected conditions when experiencing an operating emergency. The SCCRC shall inform its Reliability Coordinator, known impacted Balancing Authorities, and known impacted Transmission Operators of its actual or expected operations that result in, or could result in, an Emergency.
- 9. The SCCRC coordinates the Emergency actions for facilities in the AEP/RC common area with the associated RC.
- 10. Some common acronyms used throughout this plan are listed in the Terms and Definitions section of this document.

**References**

Document ID	Document Title
	PJM Manual M03 Transmission Operations rev 56
	PJM Manual M10 Pre-Scheduling Operations rev 38, Section 2, Generation Outage Reporting
	PJM Manual M13 Emergency Operations rev 76
	PJM Manual M14D Generation Operational Requirements rev 51

Document ID	Document Title
	PJM Manual M37 Reliability Coordination rev 17
	NERC Emergency Operations Standards <ul style="list-style-type: none"> <li>EOP 011-1 Emergency Operations</li> </ul>
	NERC Transmission Operations Standards: <ul style="list-style-type: none"> <li>TOP-001 Transmission Operations</li> <li>TOP-002 Operations Planning</li> </ul>
	AEP Congestion Management Guidelines
	AEP Voltage and Reactive Guides and Procedures
	Operator Authority to Act Procedure

## Terms and Definitions

Term	Description
<b>ALL-CALL</b>	The PJM ALL-CALL process is a one-way communications system used to send messages to member companies.
<b>Automatic Generation Control (AGC)</b>	Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority’s interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction.
<b>CC</b>	Corporate Communications
<b>Control Zone</b>	One or more transmission zones or multiple contiguous Zones as defined in PJM manuals.
<b>CSC</b>	Customer Solutions Center
<b>DDC</b>	Distribution Dispatching Center
<b>EEA</b>	NERC Energy Emergency Alert
<b>FEL</b>	Fuel, Emissions, and Logistics
<b>Interruptible Customer (Interruptible Load)</b>	<i>NERC Glossary of Terms</i> Demand that the end-use customer makes available to its Load-Serving Entity via contract or agreement for curtailment.
<b>LCC</b>	Local Control Center (synonymous with SCC)



Term	Description
LSE	Load Serving Entity
MO	Market Operations
OASIS	Open Access Same Time Information Service – An electronic posting system that the Transmission Service Provider maintains for transmission access data and that allows all transmission customers to view the data simultaneously.
RF	Reliability First
SCC	AEP System Control Center
TDC	Transmission Dispatching Center Locations: <ul style="list-style-type: none"> <li>• Columbus West</li> <li>• Columbus East</li> <li>• Columbus Central</li> <li>• Roanoke North</li> <li>• Roanoke South</li> </ul>

### 3.0 Capacity Deficiency Program

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#### 3.1 Purpose

Provide a plan for full utilization of emergency capacity resources and for orderly reduction in the aggregate customer demand on the American Electric Power AEP East/PJM system in the event of a capacity deficiency.

#### 3.2 Criteria

The goals of AEP are to safely and reliably operate the Bulk Electric System in order to avoid widespread system outages as a consequence of a major disturbance. Precautionary procedures, including maintaining Daily Operating Reserves, as specified in *Reliability First Standard BAL- 002-RFC-02* and *PJM Manual M13*, assist in avoiding serious emergency conditions such as system separation and operation at abnormal frequency.

However, adequate Daily Operating Reserves cannot always be maintained, so the use of additional emergency measures may be required. A Capacity Deficiency is a shortage of generation versus load and can be caused by generating unit outages and/or extreme internal load requirements. In the event that a report needs to be filed with the Department of Energy, NERC, or a Reliability Coordinator, the Transmission Operations Engineering group can assist in preparing those reports.

The NERC *Standard EOP 011-1* requires the Balancing Authority to have an emergency plan to mitigate Capacity Emergencies and Energy Emergencies within its Balancing Authority Area. PJM is the registered Balancing Authority in the AEP East area.

### 3.3 AEP East/PJM Procedures

The following section contains excerpts from the *PJM Manual – M13 Section 2 Revision 76*. PJM maintains the complete version of M13 on the [PJM website](#). Consult the PJM M13 for specific details about the PJM plan.

#### 3.3.1 Overview

From the *PJM Manual 13 Section 2 Revision*:

PJM is responsible for determining and declaring that an Emergency is expected to exist, exists, or has ceased to exist in any part of the PJM RTO or in any other Control Area that is interconnected directly or indirectly with the PJM RTO. PJM directs the operations of the PJM Members as necessary to manage, allocate, or alleviate an emergency.

- PJM RTO Reserve Deficiencies — If PJM determines that PJM-scheduled resources available for an Operating Day in combination with Capacity Resources operating on a self-scheduled basis are not sufficient to maintain appropriate reserve levels for the PJM RTO, PJM performs the following actions:
- Recalls energy from Capacity Resources that otherwise deliver to loads outside the Control Area and dispatches that energy to serve load in the Control Area.
- Purchases capacity or energy from resources outside the Control Area. PJM uses its best efforts to purchase capacity or energy at the lowest prices available at the time such capacity or energy is needed. The price of any such capacity or energy is eligible to determine Locational Marginal Prices in the PJM Energy Market. The cost of capacity or energy is allocated among the Market Buyers as described in the PJM Manual for Operating Agreement Accounting (M28).

In this section, the AEP System Control Center is referred to as SCC and the AEP Market Operations is referred to as MO.



### 3.4 Capacity Deficiency Summary Table

Alerts	Alert Name	Member Actions from Manual 13	SCC Actions	Other Actions
	Unit Startup Notification Alert	<ul style="list-style-type: none"> <li>Transmission / Generation dispatchers notify management of the Alert.</li> <li>Transmission / Generation dispatchers advise all stations and key personnel.</li> <li>Generation dispatchers orders unit(s) to be in the state of readiness (i.e. able to be online within 48 hours) in the lesser of (submitted notification time + startup time or 6 days) minus 48 hours.</li> <li>Generation dispatchers report to PJM Dispatch any and all resource limited facilities as they occur via Markets Gateway, as described in Section 6.4, and update PJM Dispatch as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>SCC e-mail notifications: [REDACTED]</li> <li>Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>MO notify management</li> <li>TDC advise station</li> <li>MO orders units to be in a state of readiness</li> </ul>
	Maximum Generation Emergency / Load Management Alert	<ul style="list-style-type: none"> <li>Transmission / Generation dispatchers notify management of the Alert.</li> <li>Transmission / Generation dispatchers advise all stations and key personnel.</li> </ul>	<ul style="list-style-type: none"> <li>SCC reviews scheduled or active maintenance / testing of transmission equipment that could affect generation or transmission to determine if it can be restored or cancelled</li> <li>SCC e-mail notifications: [REDACTED]</li> <li>Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>MO review scheduled or active maintenance / generation affecting capacity or critical transmission to determine if it can be deferred or cancelled</li> <li>MO report any fuel / environmental issues to PJM</li> <li>MO management of the alert.</li> </ul>

<p>Primary Reserve Alert</p>	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the alert.</li> <li>• Transmission / Generation dispatchers advise all stations and key personnel.</li> <li>• Transmission / Generation dispatchers review plans to determine if any maintenance or testing, scheduled or being performed, on any generating equipment or critical monitoring, control, or bulk power transmission facility can be deferred or cancelled.</li> <li>• Generation dispatchers report to PJM Dispatch any and all resource limited facilities as they occur via Markets Gateway, as described in Section 6.4, and update PJM Dispatch as appropriate.</li> <li>• Generation Dispatchers are to inform PJM of any environmentally restricted units and may consider the need to obtain a temporary variance from environmental regulators for specific generators in accordance with Attachment M to assist in preventing load shed. PJM is not responsible for obtaining a temporary variance from environmental regulations but will assist the member company if requested.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• SCC reviews scheduled or active maintenance / testing of transmission equipment that could affect generation or transmission to determine if it can be restored or cancelled</li> <li>• SCC request MO to evaluate the impact of current environmental constraints and start the process to lift those constraints identified.</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• MO notifies management of the alert.</li> <li>• MO review scheduled or active maintenance / generation affecting capacity or critical transmission to determine if it can be deferred or cancelled</li> <li>• MO inform PJM of any environmentally restricted units</li> </ul>
<p>Voltage Reduction Alert</p>	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the alert.</li> <li>• Transmission / Generation dispatchers advise all stations and key personnel.</li> <li>• Transmission dispatchers / DPs proceed on the basis that a Voltage Reduction Warning will be issued during this future period and take steps</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>***AEP does not have a voltage reduction program***</u></b></li> <li>• SCC issue [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	



		<p>that could expedite implementation of a Voltage Reduction Action, should one become necessary.</p> <ul style="list-style-type: none"> <li>SOS members / PJM Management consider issuing the appropriate system-wide or Control Zone-specific Public/Media Notification Message See Attachment A.</li> <li>PJM marketers remain on heightened awareness regarding PJM system conditions and the potential need for Emergency Energy Purchases.</li> </ul>		
Step	Name of Emergency Procedure	Member Actions from Manual 13	SCC Actions	Other Actions
1	Pre-emergency Load Management Reductions	<ul style="list-style-type: none"> <li>Member Curtailment Service Providers implement load management reductions as requested by PJM dispatchers.</li> </ul>	<ul style="list-style-type: none"> <li>SCC e-mail notifications: [REDACTED]</li> <li>Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>For steps 1 and 2: PJM notifies the Curtailment Service Providers directly via the DRHub (Demand Response Hub).</li> </ul>
2	Emergency Load Management Reductions Action EEA 2	<ul style="list-style-type: none"> <li>Member Curtailment Service Providers implement load management reductions as requested by PJM dispatchers.</li> <li>Member dispatchers notify management of the emergency procedure and that they should consider the use of public appeals to conserve electricity usage.</li> <li>Member dispatchers notify governmental agencies, as applicable.</li> </ul>	<ul style="list-style-type: none"> <li>SCC e-mail notifications: [REDACTED]</li> <li>Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>e-mail recipients notify appropriate government agencies</li> <li>EEA2 Requires a DOE OE-417 Report (PJM will complete the report)</li> </ul>
3	Primary Reserve Warning	<ul style="list-style-type: none"> <li>Transmission / Generation dispatchers notify management of the warning.</li> </ul>	<ul style="list-style-type: none"> <li>SCC e-mail notifications: [REDACTED]</li> <li>Verbally notify TDCs.</li> </ul>	<p>Generation Operators take necessary actions regarding</p>

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		<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers advise all stations and key personnel.</li> <li>• Generation dispatchers prepare to load all available primary reserve, if requested.</li> <li>• Transmission / Generation dispatchers ensure that all deferrable maintenance or testing affecting capacity or critical transmission is halted. Any monitoring or control maintenance work that may impact operation of the system is halted.</li> <li>• Generation dispatchers report to PJM Dispatch any and all resource limited facilities as they occur via Markets Gateway, as described in Section 6.4, and update PJM Dispatch as appropriate.</li> <li>• Generation Dispatchers are to inform PJM of any environmentally restricted units and may consider the need to obtain a temporary variance from environmental regulators for specific generators in accordance with Attachment M to assist in preventing load shed. PJM is not responsible for obtaining a temporary variance form environmental regulations but will assist the member company if requested.</li> <li>• PJM marketers remain on heightened awareness regarding PJM system conditions and the potential need for Emergency Energy Purchases.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC reviews scheduled or active maintenance / testing of transmission equipment that could affect generation or transmission to determine if it can be restored or cancelled</li> </ul>	<p>the availability and capability of generating units.</p>
<p><b>4A</b></p>	<p>Maximum Emergency Generation Action</p>	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the emergency procedure.</li> <li>• PJM Marketers recall off-system capacity sales that are recallable as directed by PJM dispatchers.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Generation Operators take necessary actions regarding the availability and capability of generating units.</li> </ul>



		<ul style="list-style-type: none"> <li>• Generation dispatchers report to PJM Dispatch any and all resource limited facilities as they occur via Markets Gateway, as described in Section 6.4, and update PJM Dispatch as appropriate.</li> <li>• Generation dispatchers suspend regulation, as requested, and load all units to the</li> <li>• Maximum Emergency generation level, as required.</li> <li>• Generation dispatchers notify PJM dispatching of any Maximum Emergency generation loaded prior to PJM requesting Maximum Emergency generation is loaded.</li> </ul>		<ul style="list-style-type: none"> <li>• TDC notify non-retail behind the meter generation for availability.</li> </ul>
4B	Emergency Voluntary Energy Only Demand Response Reduction Action	<ul style="list-style-type: none"> <li>• Curtailment Service Providers with Demand Resource(s) registered in the Energy Only</li> <li>• Option of Emergency Load Response reduce load.</li> <li>• Transmission / Generation dispatchers notify management of the emergency procedure.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Email recipients contact the necessary parties to curtail services or reduce load.</li> <li>• PJM alerts the Curtailment Service Providers directly via the DRHub (Demand Response Hub).</li> </ul>
5	Voltage Reduction Warning and Reduction of Non-Critical Plant Load	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the warning.</li> <li>• Transmission / Generation dispatchers notify governmental agencies, as applicable.</li> <li>• Transmission / Generation dispatchers advise all stations and key personnel.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>***AEP does not have a voltage reduction program***</b></li> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Email recipients contact the necessary parties to reduce non-essential loads.</li> <li>• Email recipients notify appropriate government agencies.</li> <li>• PJM alerts the Curtailment Service Providers directly</li> </ul>

		<ul style="list-style-type: none"> <li>• Generation dispatchers order all generating stations to curtail non-critical station light and power.</li> <li>• Transmission dispatchers / DPs prepare to reduce voltage, if requested.</li> <li>• Transmission dispatchers / DPs and Curtailment Service Providers notify appropriate personnel that there is a potential need to implement load management programs, in addition to interrupting their interruptible/curtailable customers in the manner prescribed by each policy, if it has not already been implemented previously. PJM marketers remain on heightened awareness regarding PJM system conditions and the potential need for Emergency Energy Purchases.</li> </ul>		via the DRHub (Demand Response Hub).
6	Curtailment of Non-Essential Building Load	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the emergency procedure and to consider the use of public appeals to conserve electricity usage.</li> <li>• Transmission dispatchers notify governmental agencies, as applicable.</li> <li>• Transmission / Generation dispatchers / DPs switch off all non-essential light and power in DP-owned commercial, operations, and administration offices.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Email recipients contact the necessary parties to make public appeals.</li> <li>• Email recipients notify appropriate government agencies.</li> <li>• Email recipients contact the necessary parties to reduce non-essential loads.</li> </ul>
7	Deploy All Resources Action	<ul style="list-style-type: none"> <li>• Member Generation Dispatchers raise all available online generating units to full output</li> <li>• (Emergency Maximum).</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• PJM notifies the Curtailment Service Providers directly via the DRHub (Demand Response Hub).</li> </ul>



		<ul style="list-style-type: none"> <li>• Member Generation Dispatchers start up all offline generation and ramp to full output</li> <li>• (Emergency Maximum), utilizing the communication methods below: Generators that can be online in less than 30-minutes should start immediately upon receipt of the ALL-CALL and then notify PJM Dispatch when they are on-line. Generators that require more than 30-minutes to be on-line should call the PJM dispatcher prior to initiating the start sequence.</li> <li>• Member Curtailment Service Providers with Load Management (Pre-Emergency and/or</li> <li>• Emergency) reduce load immediately when dispatched.</li> <li>• Transmission/Generation Dispatchers notify management of the emergency procedure and that they should consider the use of public appeals to conserve electricity usage.</li> <li>• Member dispatchers notify governmental agencies, as applicable.</li> <li>• Upon cancellation of this procedure:</li> <li>• Units that have not started should abort their start if possible.</li> <li>• Online units should return to following SCED basepoints as well as any regulation or reserve assignments.</li> </ul>		<ul style="list-style-type: none"> <li>• e-mail recipients notify appropriate government agencies</li> <li>• EEA2 Requires a DOE OE-417 Report (PJM will complete the report)</li> <li>• e-mail recipients contact the necessary parties to make public appeals.</li> <li>• e-mail recipients contact the necessary parties to reduce non-essential loads.</li> <li>• PJM alerts the Curtailment Service Providers directly via the DRHub (Demand Response Hub).</li> <li>• e-mail recipients contact the necessary parties to curtail services or reduce load.</li> <li>• MO take necessary actions regarding the availability and capability of generating units.</li> </ul>
<p>8</p>	<p>Manual Load Dump Warning</p>	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the warning.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> </ul>	<ul style="list-style-type: none"> <li>• Email recipients notify appropriate government agencies.</li> </ul>

		<ul style="list-style-type: none"> <li>• Transmission dispatchers notify governmental agencies, as applicable.</li> <li>• Transmission / Generation dispatchers advise all station and key personnel.</li> <li>• Transmission dispatchers / DPs review local procedures and prepare to shed load in the amount requested.</li> <li>• Transmission dispatchers / DPs reinforce internal communications so that load shed can occur with minimum delay.</li> <li>• PJM marketers remain on heightened awareness regarding PJM system conditions and the potential need for Emergency Energy Purchases.</li> <li>• Transmission Owner may coordinate with BtMG facility interconnected to the transmission system, or through the relevant electric distribution utility, during expected prolonged emergency load dump/shed or as otherwise necessary to help mitigate a grid emergency. As BtMG facilities do not participate in the wholesale energy market, any request to operate for the purpose of helping to mitigate a wholesale market issue is on a voluntary basis at the discretion of the BtMG owner, other than the existing Non-Retail BtMG provisions. Any request to operate to mitigate a wholesale market issue will be communicated to the BtMG as a voluntary request at the discretion of the BtMG owner, other than the existing Non-Retail BtMG provisions. Refer to Manual 14D Appendix A for more information regarding BtMG.</li> </ul>	<ul style="list-style-type: none"> <li>• Enter load shed information into the AEP Load Shed Allocation Table to determine anticipated amount of load shed for each operating company.</li> <li>• Verbally notify TDCs load dump allocations.</li> </ul>	<ul style="list-style-type: none"> <li>• TDCs prepare for the Manual Load Dump Action.</li> <li>• TDC notifies DDC.</li> </ul>
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<p>9</p>	<p>Voltage Reduction Action</p>	<ul style="list-style-type: none"> <li>• Transmission / Generation dispatchers notify management of the emergency procedure and to consider the use of public appeals to conserve electricity usage.</li> <li>• Member Transmission dispatchers notify governmental agencies, as applicable.</li> <li>• Member Transmission dispatchers / DPs take steps to implement the voltage reduction.</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>***AEP does not have a voltage reduction program***</u></b></li> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Verbally notify TDCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Email recipients contact the necessary parties to make public appeals.</li> <li>• Email recipients notify appropriate government agencies.</li> </ul>
<p>10</p>	<p>Manual Load Dump Action  EEA 3</p>	<ul style="list-style-type: none"> <li>• Generation dispatchers suspend remaining regulation, when directed by PJM prior to shedding load.</li> <li>• Transmission dispatchers / DPs shed an amount of load equal to or in excess of the amount requested by PJM dispatcher (Mid-Atlantic Region operators refer to Attachment E for specific allocation) within 5 minutes of the issued directive. The load shed plan should consider/recognize priority/critical load.</li> <li>• Transmission / Generation dispatchers notify management of the emergency procedure.</li> <li>• Transmission dispatchers / DPs consider the use (or continued use) of public appeals to conserve electricity usage and consider the use of public announcements of the emergency.</li> <li>• Transmission dispatchers notify governmental agencies, as applicable.</li> <li>• Transmission dispatchers / DPs maintain the requested amount of load relief until the load shed order is cancelled by PJM dispatcher.</li> </ul>	<ul style="list-style-type: none"> <li>• SCC e-mail notifications: [REDACTED]</li> <li>• Enter load shed information into the AEP Load Shed Allocation Table to determine anticipated amount of load shed for each operating company. (If necessary)</li> <li>• Verbally instruct TDCs to shed load per allocations.</li> </ul>	<ul style="list-style-type: none"> <li>• EEA3 Requires a DOE OE-417 Report. PJM will complete the report.</li> <li>• Email recipients notify appropriate government agencies.</li> </ul>

		<ul style="list-style-type: none"> <li>Transmission Owner may coordinate with BtMG facility interconnected to the transmission system, or through the relevant electric distribution utility, during expected prolonged emergency load dump/shed or as otherwise necessary to help mitigate a grid emergency. As BtMG facilities do not participate in the wholesale energy market, any request to operate for the purpose of helping to mitigate a wholesale market issue is on a voluntary basis at the discretion of the BtMG owner, other than the existing Non-Retail BtMG provisions. Any request to operate to mitigate a wholesale market issue will be communicated to the BtMG as a voluntary request at the discretion of the BtMG owner, other than the existing Non-Retail BtMG provisions. Refer to Manual 14D Appendix A for more information regarding BtMG.</li> </ul>		
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**Table 3-1. Capacity Deficiency Summary AEP/PJM**

**Note 1:** DOE Report required for Public Appeals/Voltage Reduction called in an EEA 2



## 3.5 Severe Weather Conditions

### 3.5.1 Cold Weather Alert

From *PJM Manual 13*:

The purpose of the Cold Weather Alert is to prepare personnel and facilities for expected extreme cold weather conditions. As a general guide, PJM can initiate a Cold Weather Alert across the RTO or on a Control Zone basis when the forecasted weather conditions approach minimum or actual temperatures of 10 degrees Fahrenheit or below. PJM can initiate a Cold Weather Alert at higher temperatures if PJM anticipates increased winds or if PJM projects a portion of gas-fired capacity is unable to obtain spot market gas during load pick-up periods. PJM initiates the Cold Weather Alert for the appropriate region(s) in advance of the operating day based on historical experience, information supplied by the pipelines, and/or information supplied from the generator owners.

Consult *PJM M13* for specific details on the PJM plan.

#### SCC Actions

- SCC and Market Operations (MO) notifies Transmission/MO management of the alert.
- SCC issues [REDACTED] e-mail notifications.
- SCC/MO/FEL review plans to determine if any maintenance or testing, scheduled or being performed, on any monitoring, control, transmission, or generating equipment can be deferred or cancelled.

#### Other Actions

- MO updates their unit parameters, including the Start-up and Notification, Min Run Time, Max Run Time, Eco Min, Eco Max, etc. in Markets Gateway.
- MO determines whether alternate fuel will be made available to PJM for dispatch. If made available, any known alternate fuel restrictions are communicated via Markets Gateway in the **operating restrictions** field. If available but only in an emergency, this also is communicated via Markets Gateway in the **operating restrictions** field.
- Based on direction received from PJM, the MO call-in or scheduled personnel ensures that all combustion turbines and diesel generators that are expected to operate are started in sufficient time and available for loading when needed for the morning pick up. This action includes operations, maintenance, and technical personnel that are necessary to gradually start all equipment during the midnight period. The units are brought on at engine idle, where possible, and loaded as necessary to maintain reliability. Once units are started, they remain on-line until the PJM dispatcher requests the units be shut down. Running combustion turbines (CTs) to provide for Synchronized Reserve is monitored closely for units where fuel and delivery may be hampered. Each generator owner attempts to start their most troublesome or unreliable units first.
- MO reviews their combustion turbine capacities, specifically units burning No. 2 fuel oil that do not have sufficient additive to protect them from the predicted low temperature.

- MO/Fuel, Emissions, and Logistics (FEL) reviews fuel supply/delivery schedules in anticipation of greater than normal operation of units.
- MO/FEL monitors and reports projected fuel limitations to the PJM dispatcher and updates the unit **Max Run** field in Markets Gateway.
- MO/FEL contacts the PJM dispatcher if they anticipate that spot market gas is unavailable, resulting in unavailability of bid-in generation.
- MO/FEL contacts PJM dispatch to inform them of gas-fired CTs placed in Maximum Emergency Generation due to daily gas limitations of less than eight hours (i.e. five hours of gas per day).
- MO updates the “early return time” for any Planned generator outages as indicated in *M-10 Section 2.2.2*

### 3.6 Hot Weather Alert

The purpose of the Hot Weather Alert is to prepare personnel and facilities for extreme hot and/or humid weather conditions. These weather conditions may cause capacity requirements/unit unavailability to be substantially higher than forecasted and are expected to persist for an extended period. A Hot Weather alert can be issued on a Control Zone basis if projected temperatures are to exceed 90 degrees with high humidity for multiple days. PJM may also issue a Hot Weather alert at lower temperatures during the spring and fall periods if there are significant amounts of generation and transmission outages that reduce available generating capacity.

Consult *PJM M13* for specific details on the PJM plan.

#### SCC Actions

- SCC/MO notifies Transmission/MO management of the alert.
- SCC issues █████ e-mail notifications.
- SCC/MO review plans to determine if any maintenance or testing, scheduled or being performed, on any monitoring, control, transmission, or generating equipment can be deferred or cancelled.

#### Other Actions

- MO updates their unit parameters, including the Start-up and Notification, Min Run Time, Max Run Time, Eco Min, Eco Max, etc. in Markets Gateway.
- MO determines whether alternate fuel will be made available to PJM for dispatch. If made available, any known alternate fuel restrictions are communicated via Markets Gateway in the **operating restrictions** field. If available but only in an emergency, this will also be communicated via Markets Gateway in the **operating restrictions** field.
- MO advises all generating stations and key personnel.
- MO/FEL report to PJM dispatcher all fuel/environmental limited facilities as they occur and update PJM dispatcher as appropriate and update the unit **Max Run** field in Markets Gateway.



- MO/FEL contact PJM dispatch to inform them of gas-fired CTs placed in Maximum Emergency Generation due to daily gas limitations of less than 8 hours (i.e. 5 hours of gas per day).
- MO will update the **early return time** for any planned generator outages as indicated in *PJM M-10 Section 2.2*
- PJM dispatcher cancels the alert when appropriate.

AEP extreme weather actions are listed in the *EOP Section 5 Transmission Emergency Procedures* under Conservative Operation and Section 6.0 Major Storm Restoration.

**AEP East/PJM**

Unit	MW (Summer/Winter)
Amos #1	20/40
Amos #2	20/40
Cardinal #1	5/15
Cardinal #2	5/15
Cardinal #3	0/5
Rockport #1	0/5
Rockport #2	5/10
Mitchell #1	10/30
Mitchell #2	20/40
<b>Total System</b>	<b>85/220</b>

**Table 3-2. AEP System – Details of Emergency Capacity Resources Extra Load Capability**

Plant	MW	Plant	MW
Amos	2		
Big Sandy	2		
Clinch River	1	Mitchell	1
Cardinal	1	Mountaineer	2
D. C. Cook	0		
		Rockport	0
		<b>Total AEP/PJM System</b>	<b>20</b>

**Table 3-3. AEP System – Details of Emergency Capacity Resources Curtailment of Generating Station Use**

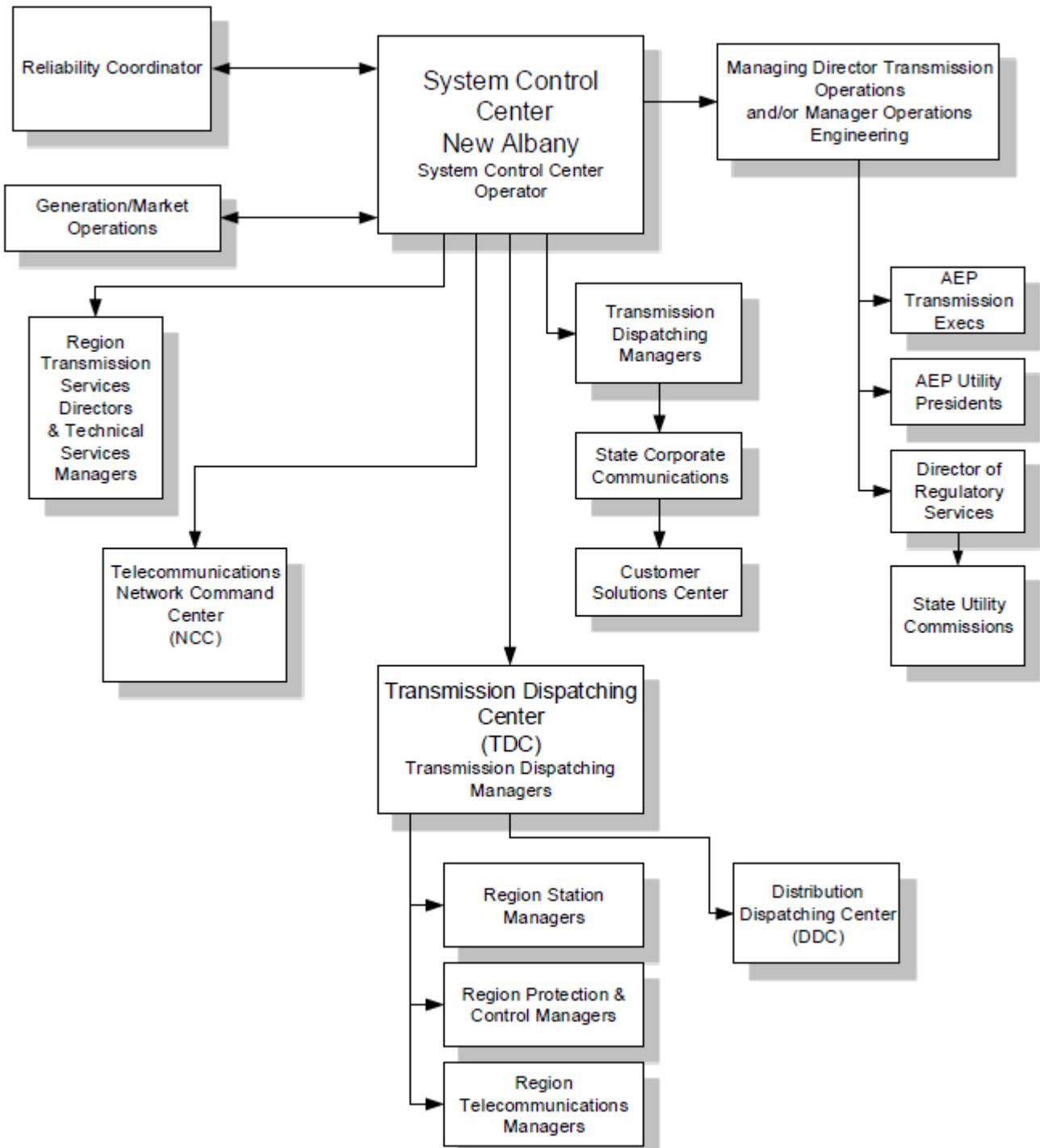


Figure 3-1. Capacity Deficiency Warning Notifications

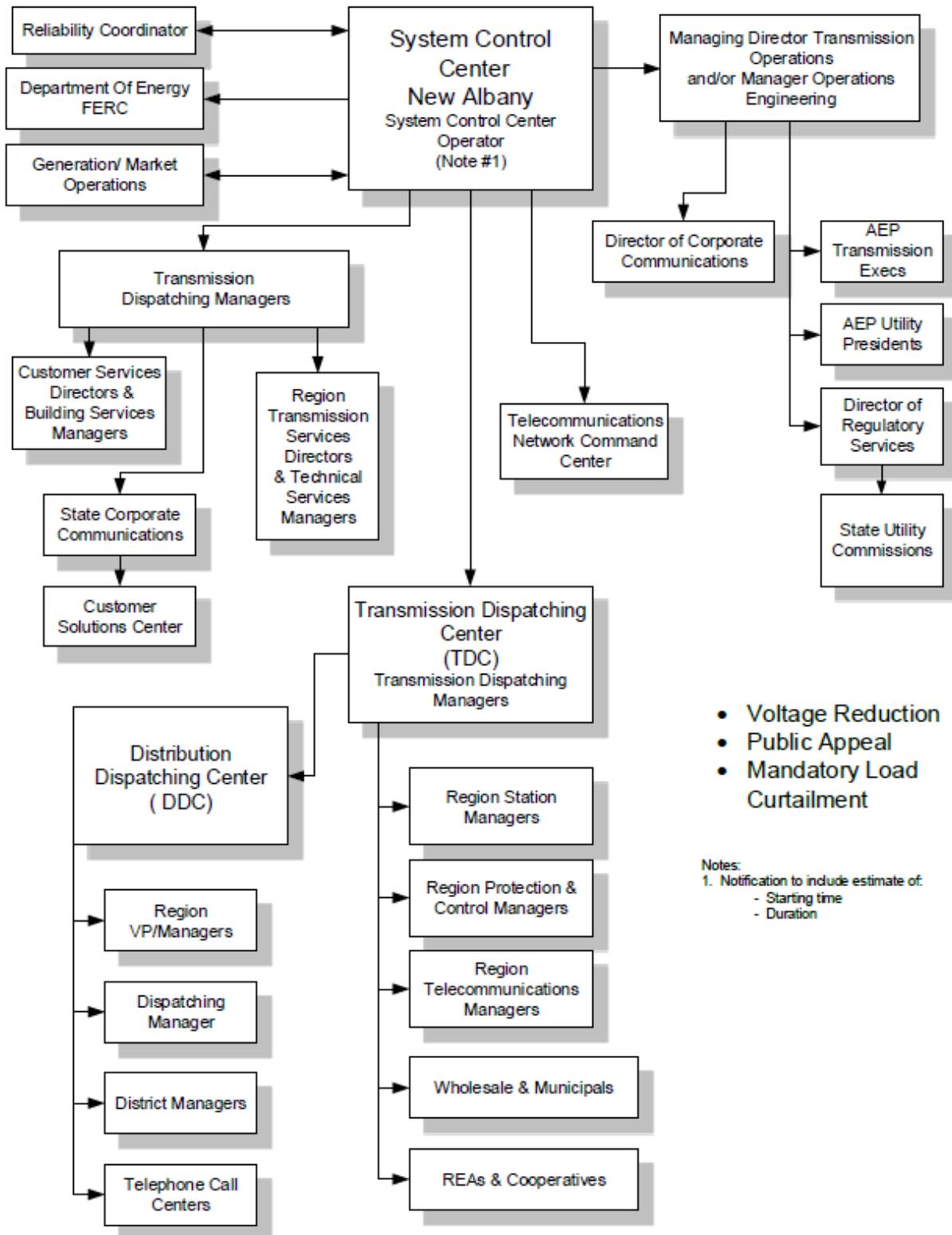


Figure 3-2. Capacity Deficiency Action Notifications

### 3.7 Emergency Messages from American Electric Power to the Public

**This is an Emergency Message from American Electric Power Company:**

Demand for electricity is expected to increase as the (excessive heat and humidity, excessive cold) continues. AEP asks customers to conserve electricity, if health permits – especially between (3 p.m. to 7 p.m. - summer, 6 a.m.-9 a.m. and 3 p.m. to 7 p.m. - winter)

Electricity customers can take simple electricity conservation steps:

- Close curtains and blinds to keep out the sun (summer), and
- Postpone using major electric household appliances such as stoves, dishwashers and clothes dryers until the evening hours, and
- If health permits, set air conditioner thermostats higher than usual (summer), or set heating thermostats lower than usual (winter), and
- Turn off electric appliances and equipment that you do not need or are not using.

Conserving electricity will help ensure adequate power supplies. AEP continues to carefully monitor the power supply conditions. It will do everything possible to keep power flowing in the region.

AEP will keep you informed by radio and television announcements until the problem eases.

AEP thanks you for your cooperation.

**Figure 3-3. Voluntary Load Curtailment Request to the Public**

**This is a Further Emergency Message from the American Electric Power Company:**

The power supply problem announced earlier has become critical.

To avoid widespread blackouts it has become necessary to interrupt electric service to customers for periods ranging from 30 minutes to two hours. To minimize inconvenience, the interruptions will take place on a rotating basis: while some areas will be off, others will be on. Later, the areas of outages will be reversed, so that no group of customers will have to bear all of the inconvenience.

Even while your electric service is on, you can help in this emergency by turning off all appliances, lights, radios, and television sets that are not essential. We recommend that you leave at least one electric light in the "on" position so that you'll know when the power is "on" or "off."

AEP thanks you for your cooperation in helping us to get through this critical time.

**Figure 3-4. Mandatory Load Curtailment Initiation Announcement to the Public**

**This is an Emergency Message from American Electric Power Company:**

The power curtailment to AEP's customers is continuing. In an effort to lessen the impact of this emergency on all of our customers, the company is alternating the power cut-off among groups of customers for periods ranging from 30 minutes to two hours. Make sure that all appliances are turned off so that, when the power is restored, it will not cause an overload and create further problems. If you are receiving power, please keep your usage to a bare minimum. Full service will be restored just as soon as conditions permit.

AEP regrets that the critical problem it now faces has made these drastic steps necessary, and thanks all of its customers for their cooperation and understanding.

Further announcements will follow as the situation continues to develop.

**Figure 3-5. Mandatory Load Curtailment Information Statement to the Public**

**This is a Message from American Electric Power Company:**

AEP reports that the critical electric power shortage has now eased, and full-time electric service has been restored to its customers.

If your electric service is still interrupted, please call the appropriate AEP Customer Solutions Center.

AEP thanks you for your cooperation and understanding. We realize the importance of your electric service.

**Figure 3-6. Capacity Deficiency Termination Statement to the Public**

## 4.0 Procedures during Abnormal System Frequency

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**Note:** A DOE Required Report if Load is shed.

### 4.1 Under-Frequency Program

Precautionary procedures are required to meet emergency conditions such as system separation and operation at subnormal frequency. In addition, the coordination of these emergency procedures with neighboring companies is essential. In the event that a report needs to be filed with the Department of Energy (DOE), NERC, or a Reliability Coordinator, the System Control Center prepares those reports and the Transmission Operations Engineering group reviews them.

#### 4.1.1 Procedures

1. From 59.8 - 60.2 Hz to the extent practicable, use all operating and emergency reserves. The manner in which these reserves are used depend a lot on the behavior of the System during the emergency. A deficient Balancing Authority shall only use the assistance provided by the Interconnection's frequency bias for the time needed to implement corrective actions. The Balancing Authority shall not unilaterally adjust generation in an attempt to return Interconnection frequency to normal beyond that supplied through frequency bias action and Interchange Schedule changes. Such unilateral adjustment may overload transmission facilities.
2. At 59.75 Hz
  - a. Suspend Automatic Generation Control (AGC).
  - b. Notify Interruptible Customers to drop load.
3. At 59.5 Hz automatically shed 5% System internal load by relay action. (25 cycle, .42 sec. delay).
4. At 59.3 Hz automatically shed an additional 5% of System internal load by relay action. (25 cycle, .42 sec. delay).
5. At 59.1 Hz automatically shed an additional 5% of System internal load by relay action. (25 cycle, .42 sec. delay).
6. At 58.9 Hz automatically shed an additional 5% of System internal load by relay action. (25 cycle, .42 sec. delay).
7. At 58.7 Hz automatically shed an additional 5% of System internal load by relay action. (25 cycle, .42 sec. delay).
8. At 58.2 Hz automatically trip the D.C. Cook Nuclear Units 1 and 2.
9. At 58.0 Hz or at generator minimum turbine off-frequency value, isolate the generating unit without time delay.

### 4.2 Automatic Load Shedding Program Specifications

1. Load shedding relays should be accurate to +/- .01 Hz with contact provisions for tripping and automatic restoration. They can be static relays or digital devices, and the automatic restoration can be by timer or supervisory control.
2. General guidelines for relay installation are:
  - a. A feeder load of 3 MWs or a total station load of 6 MW should be controlled by each static relay or digital device.



- a. Total load to be controlled by load shedding relays should equal a minimum of 25% of System internal load.
  - b. Under-frequency relays should only be installed on generators or Tie Lines where necessary. An example is the D.C. Cook Nuclear Plant.
3. The System is to be designed to provide for manually directed or automatic restoration as follows:
- a. Frequency is to be manually directed to return to 60 Hz by the SCC in conjunction with the MO and interconnections.
  - b. Load should be restored only when spinning reserve equals three times the restoration block and due consideration is given to possible automatic reclosing of interconnections by check synchronizing schemes.
  - c. Restoration blocks are determined by:
    - i. Automatic Restoration - time delay elements in series with relay reclose contact settings. Both the straight time and integrating timers must complete their sequences before a load block can be restored.
    - ii. Supervisory Control – UF trip only, no automatic restoration, meaning the underfrequency relay trips when shedding the load. However, the operator needs to restore the load manually as system conditions improve.
  - d. Each restoration block should represent one percent of system internal load. If a station does not have supervisory control but is located in a metropolitan area, the automatic restoration feature can be disabled and the feeder can be set for a UF trip only.
  - e. The restoration frequency should be 59.95 Hz. The time delay settings are shown in the table below:

Load Restored	Integrated Time at or above 59.95 Hz	Straight Time at 59.95 Hz
1st Block - 1%	4 minutes	1 seconds
2nd Block - 1%	4 minutes	2 seconds
3rd Block - 1%	4 minutes	3 seconds
4th Block - 1%	6 minutes	4 seconds
5th Block - 1%	6 minutes	5 seconds
6th Block - 1%	6 minutes	6 seconds
7th Block - 1%	8 minutes	7 seconds
8th Block - 1%	8 minutes	8 seconds
9th Block - 1%	8 minutes	9 seconds
10th Block - 1%	8 minutes	10 seconds
11th Block - 1%	10 minutes	11 seconds
12th Block - 1%	10 minutes	12 seconds
13th Block - 1%	10 minutes	13 seconds
14th Block - 1%	10 minutes	14 seconds
15th Block - 1%	10 minutes	15 seconds
16th Block - 1%	12 minutes	16 seconds
17th Block - 1%	12 minutes	17 seconds
18th Block - 1%	12 minutes	18 seconds

Load Restored	Integrated Time at or above 59.95 Hz	Straight Time at 59.95 Hz
19th Block - 1%	12 minutes	19 seconds
20th Block - 1%	12 minutes	20 seconds
21st Block - 1%	14 minutes	21 seconds
22nd Block - 1%	14 minutes	22 seconds
23rd Block - 1%	14 minutes	23 seconds
24th Block - 1%	14 minutes	24 seconds
25th Block - 1%	14 minutes	25 seconds

**Table 4-1 . Restoration Blocks – Time Delay Settings**

**Note:** An additional 30-second integrated timer setting is normally applied to the older style mechanical relays.

4. Management of the data and information system relative to the continuing status of the load shedding program is the responsibility of Transmission Operations.

If at any time in the above procedure the decline in area frequency is arrested below 59.5 Hz, an evaluation is made as to whether the area should manually shed an additional 5% of its initial load. If after five minutes, this action does not return the area frequency to 59.5 Hz or above, the area shall manually shed an additional 5% of its remaining load and continue to repeat in five-minute intervals until 59.5 Hz is reached. These steps must be completed within the time constraints imposed upon the operation of generating units that are discussed in Isolation of Coal-fired Generating Units.

It is important that units not be tripped prematurely when the frequency is declining, as such action causes the system frequency to decline further.

During any System disturbance involving a declining frequency, the power plant operator establishes communication with Market Operations. This recommendation is intended to assure coordinated restoration procedures. If this attempt with the MO is not successful, communication with the assigned Transmission Dispatch Center is established or with the SCC should TDC communication fail.

Nothing in the above noted points is intended to alter normal safe operating procedures and good operating judgment.

### 4.3 Isolation of Coal-Fired Steam Turbine Generation Units

The basic approach to handling sustained frequency deviations on the System is:

1. Use emergency capacity resources. (Refer to Section 3.0)
2. Maintain generating units in service while attempting to restore the balance between generation and load until the system frequency excursion exceeds the allowable limits for safe turbine operation as listed in the following subsection: Turbine Off-Frequency Operation.
3. Since any significant frequency deviation is accompanied by system separation, it is not possible for any one-control center to direct unit isolation. It is the responsibility of each unit operator to prevent or minimize potential damage to the unit by disconnecting the unit from the System should the frequency excursions exceed the recommended limits noted in the following subsections.

## 4.4 Turbine Off-Frequency Operation

The primary consideration for operating a steam turbine generator under loaded condition at other than rated frequency (60 Hz) is protection of the tuned rotating blading at the exhaust end of the low-pressure turbine. In most fossil applications, this may include the last two to three stages (L-0, L-1, and L-2 stages) of blading. Operation with these stages under load at a speed that results in the coincidence of a blading natural frequency and a multiple of actual turbine running speed frequency leads to blading fatigue damage. Fatigue damage is cumulative over blading service life and ultimately leads to failure and unit-forced outages.

In order to prevent blading fatigue damage, turbine operation at other than rated frequency, also known as off-frequency, should be limited. Typically, turbine blading has an off-frequency range that allows for continuous operation without the potential for blading fatigue damage. Additionally, another off-frequency range or ranges is defined where total accumulated time is limited such that blading fatigue damage is not sufficient to initiate a failure.

The purpose of this subsection is to provide plant operators with recommendations that establish allowable deviation from rated frequency for steam turbine generators under loaded conditions. It is the responsibility of each fossil unit operator to monitor and respond to system frequency excursions in order to prevent blading fatigue damage.

Recommendations for turbine off-frequency operation contained in this subsection are provided for each of the AEP System units, listed under their respective original equipment manufacturer. Operating parameters defined in the text on the following pages take into account that frequency limitations are applicable to the turbine generator equipment during load operation only and, as such, do not apply to no-load operation during startup. However, these instructions do apply to units that are operating in a load-rejected or islanded mode, and action should be taken to restore and maintain turbine speed at 3600 rpm for these units after separating from the grid.

### 4.4.1 AEP PJM Turbine Generator Units

The following information provides listings of AEP/PJM Region units and recommendations for each group of units based on their original equipment manufacturer. The original equipment manufacturers are:

- ABB
- General Electric
- Westinghouse

#### ABB Turbine Generator Units

These units use the ABB Turbine Generators:

- Cardinal 3
- Amos 3
- Mountaineer 1
- Rockport 1 and 2

Allowable Turbine Speed Range	Allowable Frequency Range	Comments
3420 rpm - 3816 rpm	57 Hz - 63.6 Hz	Unlimited (continuous) operation permitted.
Below 3420 rpm	Below 57 Hz	Operation in this speed (frequency) range not to exceed 10 seconds per occurrence.

**Table 4-2. Recommendations for ABB Turbine Generators**

### General Electric Turbine Generator Units

These units use the General Electric Turbine Generators:

- 600 MW Series
  - Cardinal 1 and 2
- 800 MW Series
  - Amos 1 and 2
  - Mitchell 2

### Westinghouse Turbine Generator Units

Two separate sets of recommended turbine off-frequency operating parameters are applicable to the Westinghouse turbine-generator sets on the AEP System. These recommended operating limitations are a function of LP turbine last-stage blade length and design. This section separates recommendations for applicable units according to last-stage blade design.

These units use the Westinghouse Turbine Generators with 18, 20, 23, 25, and 26 Inch LP Ends and 32 Inch Ruggedized LP Ends:

- Big Sandy 1

Allowable Turbine Speed Range	Allowable Frequency Range	Comments
3510 rpm – 3690 rpm	58.5 Hz - 61.5 Hz	Continuous operation in this speed (frequency) range permitted.
3360 rpm – 3510 rpm	56 Hz – 58.5 Hz	Operation in this speed (frequency) range not to exceed 10 minutes cumulative time over the life of the LP blading.

**Table 4-3 . Recommendations for Westinghouse Turbine Generators 18, 20, 23, 25, and 26-Inch LP Ends and 32-Inch Ruggedized LP Ends**

These units use the Westinghouse Turbine Generators with 28.5 through 44-Inch LP Ends:

- Mitchell 1

Allowable Turbine Speed Range	Allowable Frequency Range	Comments
3570 rpm - 3630 rpm	59.5 Hz - 60.5 Hz	Continuous operation in this speed (frequency) range permitted.
3510 rpm - 3570 rpm	58.5 Hz - 59.5 Hz	Operation in this speed (frequency) range is not to exceed 60 minutes cumulative time over the life of the unit.
3360 rpm - 3510 rpm	56 Hz - 58.5 Hz	Operation in this speed (frequency) range is not to exceed 10 minutes cumulative time over the life of the unit.

**Table 4-4. Recommendations for Westinghouse Turbine Generators 28.5 through 44-Inch LP Ends**

## 5.0 Transmission Emergency Procedures

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### 5.1 SOL/IROL Definitions

NERC Standard TOP-001 and TOP-002 outlines specific requirements and identifies accountability for developing and implementing Operating Plans to alleviate System Operating Limits (SOL) and Interconnected Reliability Operating Limits (IROL). The definitions of a SOL and IROL are as follows:

#### 5.1.1 System Operating Limit

System Operating Limit is the value (MW, MVar, Amperes, Frequency, or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include but are not limited to:

- Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
- Transient Stability Ratings (Applicable pre- and post- Contingency Stability Limits)
- Voltage Stability Ratings (Applicable pre- and post- Contingency Voltage Stability)
- System Voltage Limits (Applicable pre- and post- Contingency Voltage Limits)

#### 5.1.2 Interconnected Reliability Operating Limit

An Interconnected Reliability Operating Limit is a System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading Outages that adversely impact the reliability of the Bulk Electric System.

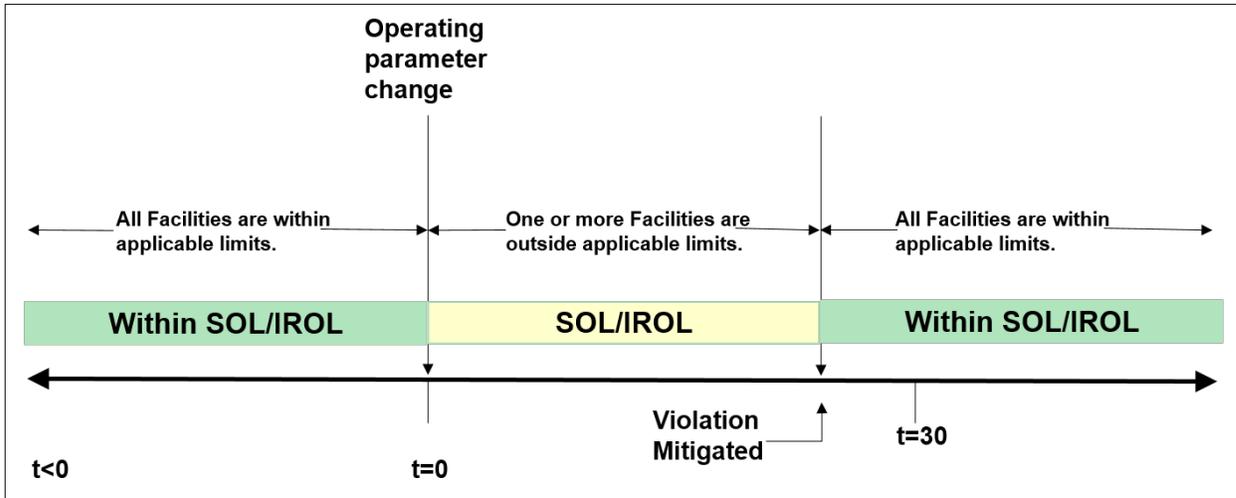


Figure 5-1. Operating Limit Timeline

## 5.2 Introduction and Conditions

The AEP Transmission System may be subject to transmission overloads or excessively low voltages during abnormal conditions. Internal loads can exceed forecasts during very hot or very cold conditions when load growth exceeds system design and new facilities are not yet in place. Capacity deficiencies in one part of the eastern interconnected network can stress AEP transmission facilities between the deficient areas and areas of excess generation. Likewise, economic interconnected operation can result in AEP transmission facilities being overloaded between available economic generation and high cost generation areas. The result of any one of these conditions or other reasons, separately or in combination, could cause unacceptable operating conditions for the AEP transmission system.

With these variables in mind, AEP must operate so that instability, uncontrolled separation, or cascading outages will not occur as a result of the most severe single contingency. AEP works in conjunction with the applicable Reliability Coordinator to mitigate any transmission emergencies on the AEP system, and should an emergency occur, makes every effort to remain connected to the Interconnection unless such actions would violate safety, equipment, regulatory, or statutory requirements.

The AEP Transmission System Control Center (SCC) shall comply with all Operating Instructions issued by the applicable Reliability Coordinator as outlined in Operator Authority to Act Procedure on TOPs ShareNow. In instances where there is a difference in derived operating limits, the AEP Transmission System shall always be operated to the most limiting parameter. An overview of the mechanisms to mitigate transmission emergencies is outlined below.

Should an event occur that requires filing a report with the Department of Energy (DOE), NERC, or a Reliability Coordinator, Real-time Operations prepares those reports with assistance from the Transmission Operations Engineering group and/or the applicable Transmission Dispatch Center personnel.

There are four types of conditions that require action:

### 1. Contingency Thermal Overloads

The outage of one facility loads a transmission element to or above its emergency capability. Loadings must be controlled to less than the emergency ratings in advance of the contingency occurring unless the overload can be controlled within a short time after the contingency.

Additional measures need to be taken upon the loss of a critical facility.

## **2. Contingency System Stability Over Limits**

The system is transmitting power at a level at which a critical outage of one facility will cause a virtually instantaneous separation across the path over which the power is being transmitted, possibly resulting in Cascading outages. Path flows must be reduced immediately to safe levels or maintained below the stability limits.

## **3. Contingency Voltage Under/Over Limits**

The voltage level is at a level at which the loss of a critical facility will result in unacceptably low voltages. If the voltage is not increased within a matter of a few seconds to a few minutes after the contingency occurs, Cascading facility outages, equipment damage for customers and AEP, and/or loss of customer load occurs. Loading levels must be reduced or other measures must be taken to immediately raise voltages before a critical contingency occurs. Also, during light load conditions, system voltages may become unacceptably high.

## **4. Actual Thermal Overloads and/or Actual Voltage Under/Over Limits**

Transmission thermal loadings are above rated capabilities and/or voltage levels are at, below, or above levels that result in equipment damage and/or Cascading outages. Action must be taken immediately to reduce facility loadings and/or raise or lower voltages.

# **5.3 Actions for Transmission System Emergencies**

If a Transmission Emergency exists or is anticipated, the SCC takes actions to alleviate the impacted area. In some cases, station or transmission maintenance, testing, or construction work that was scheduled or is in progress is reviewed to determine if such work should be cancelled or deferred to safeguard system reliability. Also, transmission facilities scheduled out of service are reviewed and returned to service if returning the facility can alleviate the emergency condition. Generation scheduled/opportunity outages and maintenance work also are reviewed to determine if returning the units alleviates the emergency condition.

The SCC notifies the Reliability Coordinator of the current and projected conditions for the emergency.

## **5.3.1 Emergency Actions**

This plan reflects these basic principles:

1. All possible actions are taken before load shedding is implemented.
2. Load shedding is used under emergency conditions to prevent Cascading outages and the spread of customer outages.
3. The transmission and generation system must be maintained as intact as possible in order to restore the system and customer loads as quickly as possible.
4. Load shedding is targeted to minimize the amount shed by choosing loads that effectively help the emergency condition(s).

When action is required because of transmission overloads or low voltages, a variety of measures can be used for relief. The order of application of transmission relief measures depends on the specific problem that exists and the time required to implement each measure. The SCC works with the Reliability

Coordinator, using NERC guidelines to achieve an effective and timely resolution of each problem. The following key points relate to transmission loading relief and voltage criteria.

- The NERC transmission loading relief (TLR) procedures are found in the *AEP Congestion Management Guidelines* document.
- It is important to maintain adequate pre-contingency voltage levels on the transmission system to prevent loss of load because of:
  - Low voltage conditions.
  - Maximizing the amount of power that can be transmitted over the power system.
  - Preventing high voltage conditions.

The *AEP Voltage and Reactive Guides and Procedures* list the AEP East and West Baseline Voltage Limits.

In addition, the *AEP Voltage and Reactive Guides and Procedures* provide guidance on monitoring, controlling, and maintaining system voltages, reactive flows, and reactive resources. The document is stored on the AEP TOPS ShareNow.

The transmission measures that are used for transmission emergencies include any or all of the following:

1. Series capacitors and reactors whose insertion or removal from service diverts power from a loaded facility and/or increases voltage in a low voltage area is used to improve system conditions.
2. Capacity resources that may be useful are used. These may include:
  - a. Curtailment of generating station use.
  - b. Curtailment of nonessential building use.
3. Reconfigure the transmission system by removing (or returning to service if possible) facilities that make a significant improvement to the problem area without causing uncontrollable problems elsewhere.
4. PJM Locational Marginal Pricing (LMP) to control congestion.
5. Curtailment of Non-Firm Transmission Service, beginning with the lowest priority reservation, in accordance with NERC Standard IRO-006. Transactions are curtailed that have a response factor of at least 5% on the overloaded facility or have a significant impact on the voltage problem. Coordination with adjacent systems ensures that all transactions that meet these criteria are cancelled whether or not AEP is directly involved in a given transaction.
6. Re-dispatch generation by reducing units that have large response factors that load the overloaded facility and increasing units with large response factors to unload the overloaded facility.
7. Contact major industrial/commercial customers to reduce load in specific regional areas that help alleviate the emergency condition.
8. Voluntary load curtailment in the specific regional areas that alleviate the emergency condition.
9. Purchase power from independent power producers (IPPs), Co-Gens, or other Market Entities, regardless of cost, and in a direction that helps alleviate the emergency condition.



10. Curtailment of Firm transmission service in accordance with NERC Standard IRO-006, on a pro-rata basis with native and network loads that have a response factor of 5% or more on the overloaded facility or a significant positive impact on the low voltage area. It is curtailed after preceding steps have been implemented or if the preceding steps are not anticipated to provide adequate relief.
11. If an overload or abnormal voltage or reactive condition persists on a transmission facility and equipment is endangered, the affected facility shall be disconnected. In doing so, AEP shall notify the applicable Reliability Coordinator and all neighboring Transmission Operators impacted by the disconnection prior to switching if time permits or immediately following.
12. If the above steps prove to be inadequate, then all other available emergency procedures are implemented including load shedding.

Additionally, some customer loads connected to AEP's transmission and sub-transmission network, such as municipalities and various co-ops, are served in whole or in part by non-AEP generation and have transmission service agreements with AEP. FERC open transmission access regulations require that AEP treat these transmission customers in a manner comparable to the service provided to AEP's own internal customers. In addition, a few large industrial customers cannot be shed at AEP supply points without fractionalizing the transmission or sub-transmission network and reducing reliability. AEP requests that these municipalities, co-ops, and industrial customers develop plans for shedding of their load when directed by the SCC.

Supervisory controlled loads are capable of shedding load within 15 minutes of a critical contingency unless otherwise noted. While it is recognized that municipalities, co-ops, and large industrials do not have this capability, they are asked and expected to shed load within 15 minutes of notification that a critical contingency has occurred. A DOE report may be required for voluntary load curtailment (PJM responsibility) and manual load shedding over 100 MW.

Copies of the Transmission Emergency Plans and documentation for specific transmission emergency procedures are located on the TOPs ShareNow as noted below.

The TOPs *AEP Congestion Management Guidelines* for the AEP/PJM/SPP areas have specific actions to be taken by the System Control Center Reliability Coordinator (SCCRC) and Reliability Coordinator (RC) for congestion events. The *AEP Congestion Management Guidelines* document is located on the AEP TOPs ShareNow at **Engineering>Operating Guidelines>AEP System Wide Guidelines and Information>AEP Congestion Management Guidelines**.

The *Congestion Management: Constraint Mitigation Action Plan Procedure* document located on the AEP TOPs Document Repository outlines processes for contingency load relief, including local load shedding. The PJM pull-down menu under the Switching tab on the AEP URL [REDACTED] documents the switching and load shed solutions for potential post-contingency local load relief warnings (PCLLRW) contingencies.

Per the PJM *Manual 37*, Section 3.1, PJM performs IROL analysis in the Planning and Operating Horizons. PJM defined several AEP facilities as IROL facilities in the *PJM Manual 3*. The IROL Relief Procedure – AEP PJM/MISO contains specific actions to be taken by the System Control Center Operator and Reliability Coordinator (RC) for IROL events. The document is on the AEP TOPs ShareNow at [REDACTED] for the East area.

*PJM Manual 3* rev 56, Section 5 lists a potential IROL facility that is managed by PJM/MISO via conservative operations.

The AEP *Transmission Operations Coordination and Communications of Ratings* document outlines a process for communicating AEP facility ratings. AEP Transmission Operations is responsible for maintaining accurate ratings within the State Estimator (SE) and communicating rating changes to the applicable RC. AEP Transmission Operations is notified by AEP Transmission Planning of rating changes as the Kremlin databases are updated with revised rating information. Transmission Operations act as a catalyst to initiate facility rating reviews as Transmission Operations becomes aware of planned and unplanned outages and system changes that can impact facility ratings. Upon completion of a facility rating review and official notification of the facility rating change, Transmission Operations Engineering updates the SE and Transmission Dispatch Center (TDC) SCADA systems and provides this information to the RC through established processes. For additional details refer to the *Coordination Communications of Ratings R5* document on TOps ShareNow at [REDACTED]

## 5.4 AEP/PJM – [REDACTED]

### 5.4.1 System Description – [REDACTED]

[REDACTED]

## 5.5 Plant Fault Duty Procedures

### OHIO - Cardinal 1

To prevent exceeding the fault duty current capability on the 138kV bus circuit breakers at Tidd, when Cardinal Unit 1 is online, normal configuration at Tidd, shall be to operate CB-M2 and CB-M1 as normally open, which will tie Tidd 345/138 TR B to the Gable SW 138 circuit through CB\_M. Other safe scenarios are described in the Tidd 138kV switchyard Op Guide.

- Refer to the Tidd138kV Switchyard Operating Guidelines for over-duty Circuit Breakers on the TOPs Document Repository for additional information.

## 5.6 Geomagnetic Disturbance Operating Procedure

Geomagnetic storms can cause large fluctuations in the earth's magnetic field. During these storms, geomagnetic induced current (GIC) is produced in the electric power system. The GIC flow through the power system via the neutral grounding points of the wye connected transformers, which can result in saturation of the transformer cores. Transformer saturation causes the excitation current to rise sharply. An increase in the excitation current usage of a transformer may be noticed as an increase in the lagging VAR usage of the transformer. This increase in lagging VAR usage can lead to system reactive power deficiencies and voltage problems.

### 5.6.1 Highlights of Procedure

AEP's Geomagnetic Disturbance (GMD) procedure:

1. Ensures the SCC and Corpus SCC are aware of GMD space weather forecast information.
2. Provides guidance on a response to the potential GMD event.
3. Includes voltage monitoring which is a proxy for the Loss of Reactive Power Support.
4. Provides options to reduce the risk of damage to transformers with DC neutral current monitoring.

5. Has procedures addressing PJM member actions requirements.
6. Provides conditions for terminating the GMD procedure.

Refer to the Geomagnetic Disturbance Operating Procedure for specific details.

## 5.7 NERC Transmission Loading Relief Procedure

The NERC Transmission Loading Relief (TLR) Procedure is an Eastern Interconnection-wide procedure to allow the Reliability Coordinator to:

- Respect Transmission Service reservation priorities.
- Mitigate potential or actual limit violations.

The Congestion Management Guideline document covers the TLR procedure.

## 5.8 Additional PJM Emergency Procedures

### 5.8.1 PJM – Thermal Operating Guides

PJM *Transmission Operations M03* and *Emergency Manual 13* have times to correct thermal limitations being exceeded. PJM has these times posted on their website. The *AEP Congestion Management Guidelines* document also addresses the time-to-correct limitations.

## 5.9 Voltage Limit Violations

The most current version of the PJM time-to-correct procedures are located on the PJM website.

## 5.10 Heavy Load, Low Voltage Conditions

Refer to *PJM Manual 13*, Section 5 for details on their procedure.

The following may be used to supplement other existing procedures when system loads are heavy and bulk power voltage levels are at or approaching undesirable low levels whether on an anticipated or actual basis. These procedures consist of the following:

- Low Voltage Alert
- Heavy Load Voltage Schedule Warning
- Heavy Load Voltage Schedule Action

### 5.10.1 Low Voltage Alert

The purpose of the Low Voltage Alert is to heighten awareness, increase planning, analysis, and preparation efforts when heavy loads and low voltages are anticipated in upcoming operating periods. PJM issues this alert to members (Generation and Transmission) when projections show these conditions are expected. This Alert can be issued for the entire PJM RTO, specific Control Zone(s), or a subset of Control Zone(s).

SCC Actions:

- SCC notifies transmission management of the alert

- SCC works with TOE/TDCs to review plans to determine if any maintenance or testing can be deferred or canceled
- SCC responds to PJM Reactive Reserve Check (if issued)

### 5.10.2 Heavy Load Voltage Schedule Warning

A Heavy Load Voltage Schedule Warning is issued to members via the ALL-CALL system (Generation and Transmission) to request members to prepare for maximum support of voltages on the bulk power system. This warning can be issued for the entire PJM RTO, specific Control Zone(s), or a subset of Control Zone(s).

SCC Actions:

- SCC will notify transmission management of the alert
- SCC will notify TDCs, while observing established limits to ensure all underlying shunt reactors are out of service, and underlying capacitors are in service

### 5.10.3 Heavy Load Voltage Schedule Action

A Heavy Load Voltage Schedule is issued to members (Generation and Transmission) at peak load periods via the ALL-CALL system to request maximum support of voltages on the bulk power system and increase reactive reserves at the EHV level. This action can be issued for the entire PJM RTO, specific Control Zone(s), or a subset of Control Zone(s).

SCC Actions:

- SCC will notify transmission management of the alert
- SCC will notify TDCs, while observing established limits, to ensure all underlying shunt reactors are out of service and capacitors are in service
- SCC will coordinate with TDCs/PJM to remove 765kV reactors as needed to support voltage.
- SCC will verify AEP Generation has moved all units connected to the transmission system at 138 kV or lower to the high side of their voltage schedule for AEP owned units
- SCC will verify IPPs connected to the transmission system at 138 kV or lower to the high side of their voltage schedule
- SCC will verify EHV units are in the normal voltage schedule

## 5.11 Light Load, High Voltage Conditions

### 5.11.1 Minimum Generation Advisory and Minimum Generation Alert

The purpose of the Minimum Generation Advisory and Minimum Generation Alert are to provide and early alert that System conditions may require the use of PJM Emergency Procedures. They are implement when the expected generation level is within 2,500 MW of the normal minimum energy limits.

The actions are carried for a Minimum Generation Advisory and Minimum Generation Alert are carried out by Generation Dispatchers.

SCC Actions:

- SCC will notify transmission management of the action

### 5.11.2 Minimum Generation Emergency Declaration

Minimum Generation Emergency Declaration is to notify members of Min Gen survey results and strategy, including the anticipated amount of reducible generation and forecasted time of the reduction.

The actions are carried for a Minimum Generation Emergency Declaration are carried out by Generation Dispatchers.

SCC Actions:

- SCC will notify transmission management of the action

### 5.11.3 Minimum Generation Event

Minimum Generation Emergency Event is implemented when PJM Dispatch can no longer match the decreasing load and utilization of emergency reducible generation is necessary. PJM shall not differentiate between resource types during a Minimum Generation Emergency Event. All resources are expected to reduce proportionally based on the percentage Emergency Reducible Generation declared.

The actions are carried for a Minimum Generation Emergency Event are carried out by Generation Dispatchers.

SCC Actions:

- SCC will notify transmission management of the action

### 5.11.4 High System Voltage Action

The purpose of the High System Voltage Action is to proactively take steps to control high voltage prior to entering a light load period.

SCC Actions:

- SCC will notify transmission management of the action
- SCC will notify TDCs, while observing established limits, to ensure all shunt reactors are in service and capacitors are out of service. (765kV Reactors will be coordinated through PJM).
- SCC will verify that SVCs are operating in the lead
- SCC will verify AEP Generation has moved all units connected to the transmission system to the low side of their voltage schedule for AEP owned units
- SCC will verify IPPs connected to the transmission system to the low side of their voltage schedule

## 5.12 Post-Contingency Local Load Relief Warning

*PJM Manual 13 – Section 5.4*

The purpose of the Post Contingency Local Load Relief Warning (PCLLRW) is to provide advance notice to a transmission owner(s) of the potential for load shed in their area(s). It is issued after all other means of transmission constraint control have been exhausted or until sufficient generation is online to control the

constraint within designated limits and timelines as identified in PJM Manual 3 Transmission Operations, Section 2 –Thermal Operating Guidelines.

The Congestion Management: Constraint Mitigation Action Plan Procedure document has specific procedures to determine the course of action to mitigate the overloads/undervoltage if the identified outage occurs for a PCLLRW. The actions could include system reconfiguration and/or load shed. The AEP procedures follow the PJM Member Actions in Section 5.4 of M-13.

Please refer to Congestion Management: Constraint Mitigation Action Plan Procedure document located on the TOps Document Repository for detailed information.

## 5.13 Post-Contingency Load Dump Limit Exceedance Analysis

From the *PJM Manual 13 – Section 5.4.1*:

If the post-contingency flow were to exceed the 15-minute Load Dump rating, there is a concern that the facility may trip before actions could be implemented to reduce the flow within limits. To prepare for this potential N- 2 (initial contingency plus the overloaded facility) and prevent a cascade, PJM will perform up to an N-5 analysis on facilities over 115% of their 15-minute Load Dump rating.

More details are located in *PJM Manual-13: Emergency Operations*.

Complete details of the switching solution process are available in *PJM Manual-03: Transmission Operations*.

For AEP Transmission Operations' specific response to PCLLRWs issued by PJM, see the *PCLLRW- PCAP Procedure* document.

## 5.14 PJM Reactive Reserve Check

Per *PJM Manual 03 section 3.12*, upon the request of PJM, The System Control Centers (SCC) provides a Reactive Reserve Check (RRC) data to PJM. This information is filled out in the PJM eDart interface.

Units Equipped with [REDACTED]

## 5.15 Units Equipped with [REDACTED]

The Voltage\_and\_Reactive\_Guide\_AEPE\_AEPW-SPP contains the list of [REDACTED] controls that resides on the AEP TOps ShareNow.

## 5.16 Conservative Operation

The need to operate the PJM RTO and the AEP East Control Zone more conservatively can be triggered by any number of weather, environmental, terrorist, or computer events, including:

- Forest fires/brush fires that threaten major transmission circuits.
- Extreme weather-related events, such as ice/snow/wind storms, severely cold/hot weather, hurricanes, tornadoes, severe thunderstorms, and floods.
- Environmental alerts.



- Terrorist alerts.
- GMD disturbance events.
- Widespread fuel-related emergencies.
- Failure of Energy Management System (EMS)/Control Area CAMS computers.

During conservative operations, the PJM Reliability Coordinator may reflect conservative transfer limit values, select double-contingencies for review, and/or evaluate maximum credible disturbances.

- The PJM Reliability Coordinator has the authority to reduce transfers into, across, or through the PJM RTO or to take other actions, such as cost assignments to increase reserves and reduce power flows on selected facilities.
- It is the PJM Reliability Coordinator's responsibility to analyze the reliability of the PJM RTO and determine if it is in jeopardy. If required, operations planning branch staff are called upon to develop revised limitation curves.
- SCC Reliability Coordinators, MO generation dispatchers, and MO/PJM marketers respond, as required, to specific requests and Operating Instructions of the PJM Reliability Coordinator subject to the constraints noted in the *Operator Responsibility and Authority to Act Procedure*.

AEP Transmission Operations Engineering personnel are to provide support to transmission dispatchers.

AEP continuously monitors facility operating limits to ensure reliability following the next anticipated contingency. Various applications, tools, and studies are used for performing Real-time Assessments (RTA). These applications, tools, and studies are critical for use in monitoring actual conditions and for developing operating plans for anticipated post-contingency conditions on AEP facilities to ensure reliable operation within facility operating limits. Actions must be taken for conditions noted in the Real-time Assessment Methodology procedure document.

## 5.17 Emergency Messages

Samples of messages to be broadcast in affected areas and procedures for communicating transmission emergencies are included in the Figures below. Messages will be modified as necessary to convey the nature of the problem and the extent of the area affected.

**This is an Emergency Message from American Electric Power Company**

*Location, Date* –A serious electric transmission constraint is anticipated *today/tomorrow, Day, Date* as a result of the extremely hot weather.

To help ease this problem AEP urges all its customers in homes, factories, stores and everywhere in *Districts Affected*, to reduce their usage of electric power in every possible way, during the hours of 7AM through 9PM on *Day, Date*. Please avoid using such appliances as clothes washers, dishwashers, clothes dryers, and ranges; turn off unnecessary lighting; and turn up the thermostat for air conditioning or turn off the air conditioning. Cooperation in reducing the demand for electricity during daylight hours all day will help prevent interruption of electric service.

AEP will keep customers informed with public announcements until this transmission constraint eases.

**Energy Conservation Tips:**

- Set the thermostat between 78 and 80 degrees and operate ceiling fans for additional comfort with raised temperatures.
- Draw drapes and close blinds to help cool the home.
- Turn off unnecessary lights.
- Turn off all non-essential equipment and appliances.
- Reduce hot water consumption
- Limit opening refrigerators and freezers.
- Limit water consumption if you are on well water.
- Limit use of kitchen appliances, dishwashers, ranges, etc.
- Avoid using washers and dryers.

AEP appreciates the patience and cooperation of our customers during this extreme heat wave. Please cooperate now by reducing your use of electricity. By doing this, you can help prevent possible interruptions in your electric service. AEP will continue to keep you informed with public announcements until this problem eases and we thank you for your cooperation.

**Figure 5-2. Voluntary Load Curtailment Initiation Announcement to the Public**

**This is an Emergency Message from American Electric Power Company**

A serious electric transmission constraint has developed as a result of (unprecedented cold weather, unprecedented hot weather).

To avoid uncontrolled blackouts it has become necessary to interrupt electric service to customers for periods ranging from ten minutes to two hours. To minimize inconvenience, the interruptions will take place on a rotating basis; while some areas will be off, others will be on. Later, the areas of outages will be reversed, so that no group of customers will have to bear all of the inconvenience.

When service is restored in your house, you can help AEP hasten the job by turning off all appliances, lights, radios, stereos, and television sets that were in use at the time the electricity went off. We recommend that you leave one low-watt electric light in the "on" position so that you'll know when the power has been restored.

AEP thanks you for your cooperation in helping us to get through this critical time.

**Figure 5-3. Mandatory Load Curtailment Initiation Announcement to the Public**

**This is an Emergency Message from American Electric Power Company**

The power curtailment to AEP's customers is continuing. In an effort to make this situation as easy as possible for all customers, the company is alternating the power cut-off among groups of customers for periods ranging from ten minutes to two hours. Make sure that all appliances are turned off so that, when the power is restored, it will not cause an overload and create further problems. If you are receiving power, please keep your usage to a bare minimum. With everyone cooperating, the company hopes to be able to restore full service as soon as conditions permit.

AEP regrets that the critical problem it now faces has made these drastic steps necessary, and thanks all of its customers for their cooperation and understanding.

Further announcements will follow as the situation continues to develop.

**Figure 5-4. Mandatory Load Curtailment Information Statement to the Public**

**This is an Emergency Message from American Electric Power Company**

AEP reports that the serious electric transmission constraint has now eased, and full-time electric service to its customers is being restored as quickly as possible.

While the power situation has improved enough to permit us to restore service, we ask you to continue to be careful in your power use. With your cooperation, we have come through this emergency in good shape, and we are grateful.

AEP thanks you.

**Figure 5-5. Transmission Emergency Termination Statement to the Public**

## 6.0 Major Storm Restoration

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*“No aspect of operations is more important than the health and safety of people. Our customers’ needs are met in harmony with environmental protection.” ~AEP Health and Safety Manual*

### 6.1 Introduction

Super Storm Sandy, the June 2012 Derecho, the 2008 Hurricane Ike, and other big storms brought a critical eye to the way utilities respond to large storms and other emergencies. Hurricane Ike is unique in that it impacted both the AEP West and AEP East areas. Initially the storm involved the AEP West SWEPCO area. The remnants of the storm then produced significant wind damage across the AEP East Ohio area.

As a result of the frequent large storm events, AEP developed the Emergency Response Plan to improve emergency response efforts. In addition, Transmission Operations further developed several tools and process documents, such as the Outage Tracking System (OTS), the *New Albany Transmission Operations Center Major Event Coordination* document, and the *TDC Storm Manual Tulsa Region*, which align with the AEP Emergency Response Plan.

### 6.2 AEP Emergency Response Plan – Overview

The AEP Emergency Response Plan [REDACTED] is a multi-year project to improve emergency response efforts within AEP and between Regulatory agencies and customers. The ERP project focuses on three key areas to improve AEP’s emergency response:

1. Incident Command System (ICS) – ICS is a comprehensive approach to incident management. The management tool responds to both small and large emergencies.
2. Technology Deployment
  - a. Outage Management System [REDACTED]
  - b. Enhanced Estimated Time of Restoration (ETR)
  - c. Assessment and restoration processes
3. Process Improvement – improve the storm management structure and focus on assessment and restoration processes.

ERP currently has 32 processes within the AEP ICS system. Each process is described in detail at the [REDACTED] website under the forms, checklist, procedures, and training materials area. A number of these processes are transmission-specific and are listed below. Transmission Field Services (TFS) is the owner for the following transmission processes:

- ICS\_Event\_Level\_Determination\_-\_Transmission\_Process
- Transmission\_Assessment\_Process
- Transmission\_Priority\_Process

### 6.3 AEP ERP – Declaration of Transmission Emergency

One of the most important steps in the ERP is assessing the impact of the event and determining the severity of the event. For transmission related events, Transmission Field Services (TFS) and Transmission Operations (TOPs) play a key role in the initial event assessment. The *ICS Event Level Determination – Transmission Process* document contains a process flow chart to identify the event level to activate the appropriate transmission response. The response levels vary from I to V with I being the most severe.

A declaration of a Transmission Emergency will be determined by the TFS Managing Director and the TOPs Managing Director or their designees. Upon the declaration, the Directors notify the vice presidents (VPs) of AEP Transmission as well as the State Presidents of the emergency. The System Control Center Reliability Coordinators notify the Managing Directors of AEP Transmission, Corporate Communications, Network Command Center, Customer Services, and the TDCs. The TDCs notify the Region Managers and the DDCs.

### 6.4 AEP ERP – Transmission Operations Overview

Upon declaration of a Transmission Emergency, TOPs uses the processes outlined in the Storm Restoration Plan below and as shown in the *New Albany Transmission Operations Center Major Event Coordination* document (located on TOPs ShareNow [REDACTED]) and the *TDC Storm Manual Tulsa Region* (located on the TOPs ShareNow at [REDACTED]). These plans establish roles and responsibilities, and notification requirements during a major transmission event. Objectives include assessing the event, stabilizing the grid, restoring customers in a safe, efficient manner, and restoration of the grid to its original configuration. The TDC Unit Leader is part of the ICS structure and is the liaison to ICS. The TDC Unit Leader must meet the training requirements defined by ICS.

TOPs uses the Outage Tracking System [REDACTED] which enhances communication between Transmission Dispatch, Distribution Dispatch, Transmission Field Services, and AEP management during major system events by providing a shared communication tool for the exchange of transmission outage information. OTS is responsible for setting restoration priorities. The OTS program supports ICS during system events by allowing all approved AEP employees access to transmission and sub-transmission outage data via the OTS website.

### 6.5 AEP ERP – Training Personnel

TOPs dispatch personnel, as well as applicable personnel throughout Transmission, are trained in the ICS process. Additional ICS training manuals and links to the online training in KEY are listed on the [REDACTED] website under the References book icon and are available as needed. In addition, TOPs and Transmission Field Services Management are responsible for scheduling and training personnel on a regular basis so that the appropriate personnel are prepared to use the ICS structure and implement the Storm Restoration Plan when a major event occurs.

### 6.6 Storm Restoration Plan

*The key to a successful restoration effort is in the EARLY assessment of the extent of the damages.*

It is important to initiate the Storm Restoration Plan as soon as possible to ensure early assessment. The earlier the need for additional resources is identified, the sooner those resources can be mobilized and utilized in the restoration effort. However, as the outage situation worsens and the outage footprint expands, additional resources must be called upon to assist in the restoration efforts. Communications with the various Coordination Centers is facilitated by the use of conference bridges. As noted in the NATOC Major Event Coordination document, the conference bridge number(s) will be disseminated to all parties via text or email.

### 6.6.1 Restoration Priority

When a major outage emergency occurs, there is usually damage to the company facilities at a number of locations. The removal of hazardous conditions is the highest priority. Maximum effort is then placed on stabilizing the transmission grid to prevent the spread of outages to other areas not directly impacted by the storm. Once the transmission grid is stabilized, service to stations and customers proceeds as quickly and safely as possible with the primary effort being placed where the largest number of customers are impacted.

Communicating accurate information in a timely manner during a major event is a critical component in the expedient restoration of the transmission system. The Outage Tracking System (OTS) provides the communication interface between Transmission Dispatch, Distribution Dispatch, and Transmission Field Services by providing multiple designated users the ability to input Real-time data into a shared web application. The shared web application, Data Entry Interface, can be accessed by typing [REDACTED] into the browser address bar.

The OTS program supports the ICS structure during system events by allowing all approved AEP employees access to transmission and sub-transmission outage data via the OTS website. The website gives users the ability to sort and research data. Data includes Transmission outages, Distribution network circuit outages, affected stations, estimated assessment times (EAT), estimated field repair time (EFRT), estimated restoration times (ERT), trouble information, priority status (Station and Circuit/Equipment), and restoration rank. Refer to the *Outage Tracking System Guide -2015* user guide for additional information about getting access to the OTS system.

### 6.6.2 Staffing

The TDC Unit Leader and the SCC Lead Operator are responsible for allocating appropriate staff to manage the event. Additional staffing information is included in the NATOC Major Event Coordination document, which also includes staffing responsibilities for Transmission Operations Engineering and State Estimator Support personnel. Transmission Operations management also continuously evaluates the staffing needs as the event progresses.

### 6.6.3 Communications

#### Initial Notifications for Storm Restoration Plan

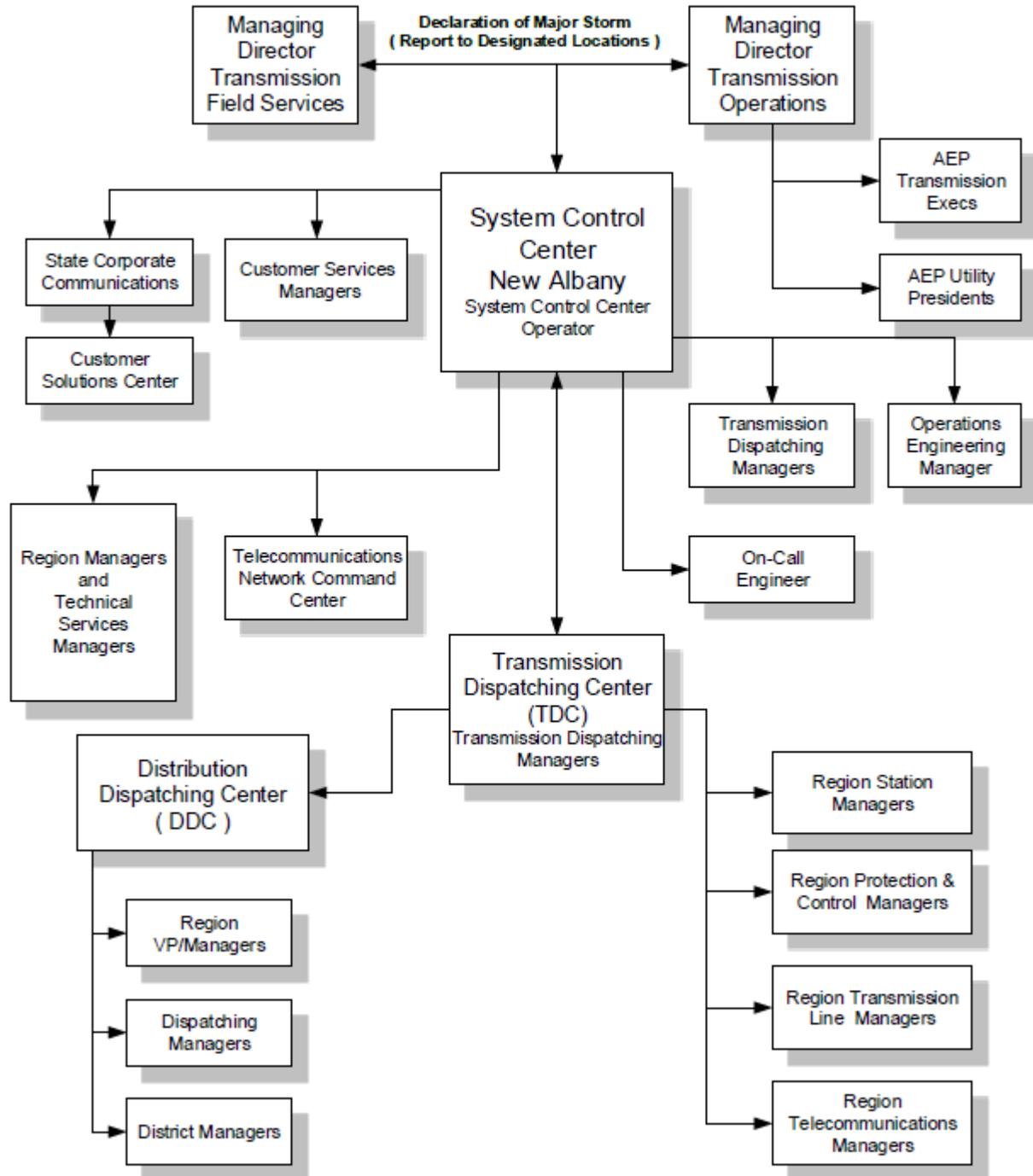


Figure 6-1. Initial Notifications for Storm Restoration Plan Flow Chart

### 6.6.4 Storm Organization Responsibilities

Storm Titles	Description of Responsibilities	Sources
<p><b>Transmission Field Services (TFS)</b></p>	<p>Determine work priorities and convey them to the SCC.</p> <p>Interface with state commissions via Regulatory Services, Corporate Communications, State Emergency Services, and all other outside entities.</p> <p>Interface with Distribution Region management.</p> <p>Identify damage via the Transmission Assessment Process.</p> <p>Establish restoration priorities in accordance with the Transmission Prioritization Process.</p> <p>Set storm administrative policies.</p> <p>Request Telecom to call out personnel to reprogram radios.</p> <p>Determine location for reprogramming 800 Mhz radios.</p> <p>Determine the additional communication equipment required and request Telecom to acquire.</p> <p>Arrange for line fault locating equipment.</p> <p>Determine equipment that foreign crews should bring with them.</p> <p>Keep management informed and provide reports as required.</p>	<p>Transmission Region Director and designees</p> <p>Transmission Operations Managers and their designees</p> <p>Distribution Operations representative</p>
<p><b>System Control Center (SCC)</b></p>	<p>Send e-mail notification to TFS of the status of facilities.</p> <p>Provide information to TDC who assist TFS in making work priorities.</p> <p>Obtain information from the TDCs about the status of company facilities.</p> <p>Keep management informed and provide reports as required.</p> <p>Assist with informing Company Management.</p> <p>Call in Operations Engineering.</p>	<p>Transmission Operations Managers</p> <p>System Control Center Operators</p> <p>Engineering Support</p>
<p><b>Transmission Dispatch Center (TDC)</b></p>	<p>Dispatch crews.</p> <p>Direct necessary switching.</p> <p>Convey area and D-Region work priorities to SCC.</p> <p>Receive damage assessment from crews.</p> <p>Assign personnel to stations as needed.</p>	<p>Dispatching Supervisors</p> <p>Dispatching Coordinators</p> <p>Transmission Dispatchers</p>



Storm Titles	Description of Responsibilities	Sources
	<p>Monitor location of crews.</p> <p>Coordinate priorities with the DDCs and pass regional work priorities to the DDCs.</p> <p>Convey equipment status to the DDCs and SCC.</p> <p>Provide outage/restoration information to the SCC at regular intervals.</p> <p>Assign 800 Mhz radio storm emergency channels for Transmission work crews.</p>	
<p><b>Distribution Dispatching Center (DDC)</b></p>	<p>Direct switching on the distribution system from the feeder breakers out.</p> <p>Coordinate work priorities with the TDCs.</p> <p>Dispatch personnel in response to distribution alarms.</p> <p>Provide reports on total customer outages at regular time intervals.</p> <p>Provide distribution equipment status to TDCs.</p> <p>Work directly with the Customer Solutions Center to respond to customer outages.</p> <p>Interface with critical customers such as those on life support systems.</p>	<p>Dispatching Managers</p> <p>Dispatching Supervisors</p> <p>Distribution Dispatchers</p>
<p><b>Field Crews</b></p>	<p>Provide damage assessments to TDCs and TFS.</p> <p>Determine equipment, materials, and personnel needs and provide this information to TFS and others as assigned.</p> <p>Carry out the administrative directives of the TFS.</p> <p>Restore service to facilities as directed by the TDC.</p> <p>Provide property owner damage assessments to TFS.</p> <p>Respond to property owner damage.</p> <p>Receive and conduct switching orders from the TDC.</p> <p>Clear roads into stations.</p> <p>Operate line fault locating equipment.</p> <p>Maintain station batteries.</p> <p>Assist Telecommunication to reach MW sites as requested.</p> <p>Have all accident investigation forms</p>	<p>T-Line personnel</p> <p>P&amp;C personnel Station personnel</p>
<p><b>Telecommunications</b></p>	<p>Lease cell phones.</p>	<p>Telecommunication technicians</p>

Storm Titles	Description of Responsibilities	Sources
	Provide temporary communications equipment. Provide communications equipment maintenance to include microwave sites. Program 800 MHz radios for incoming crews at the designated location. Provide hand-held 800 MHz radios to field personnel as requested. Provide outside maintenance services as required.	
<b>Customer Services</b>	Respond to inquiries from customers. Interface with the SCC\TDC regarding restoration status. Inform customers of estimated restoration times.	A person from Customer Services is assigned to interface with their Field Engineers.
<b>Shared Services</b>	Provides 24 hours per day vehicle and stores services. Provides specialty permits for incoming crews.	Stores attendants Garage attendants
<b>Corporate Communications</b>	Act as the liaison between the TFS Directors, the outside media, and government organizations.	Corporate Communications
<b>Customer Solutions Center</b>	Respond to customer inquiries. Generate trouble tickets. Inform customers of estimated restoration times.	Customer Solutions Center

**Table 6-1. Storm Organizational Responsibilities Matrix**

These activities support the AEP Emergency Response Plan. The ICS structure is still being implemented in the APCO area.

### 6.6.5 Storm Emergency Communications

Storm radios exist for use by AEP East Transmission Operations during major storms.

The Transmission Dispatcher determines when their assigned storm radio will be used during transmission emergencies to increase communications within their dispatching area. It is the responsibility of the Transmission Dispatcher to inform both the transmission crew supervisors working in the area as well as TFS when storm channels are to be used.

Each AEP East transmission vehicle can communicate via the radios in the normal area of use plus as many radio sites as possible in the adjacent area(s).

NATOC has access to [REDACTED] through [REDACTED] for all of I&M and AEP Ohio.

Roanoke TDC has access to [REDACTED] through [REDACTED] for all of APCo.



Figure 6-2. Storm Channels

## 7.0 Introduction DOE and NERC Event Reporting Requirements

This section relates to the NERC reporting requirements under *NERC standard EOP-004*. AEP applicable NERC entities include Transmission Operators and Generator Operators registrations. In addition, the Department of Energy (DOE) requires **OE-417** form, **Electronic Incident and Disturbance Report**, be completed and filed for incidents listed in **Schedule 1** of form OE-417 and in the instructions for form **OE-417**. The AEP Event Reporting Operating Plan consolidates both the NERC and DOE requirements into one cohesive plan along with the critical reporting timelines.

## 8.0 Emergency Communications

The following items from PJM define the conditions when emergency communications should take place between Reliability Coordinators, System Control Center Reliability Coordinators or Operating Authorities, and Transmission Dispatchers.

*PJM Manual 01 Section 2.6.1* addresses emergency EMS outages. Section 3.2.3 addresses data exchange during a loss of EMS data.

Each Transmission Operator shall have Interpersonal Communication capability with its Reliability Coordinator, each Balancing Authority, Distribution Provider, Generator Operator, and adjacent Transmission Operator.

Each Transmission Operator shall notify entities within 60 minutes of detecting a failure of its Interpersonal Communication capability that lasts 30 minutes or longer.

The following communications diagram depicts the various paths of the required communication:

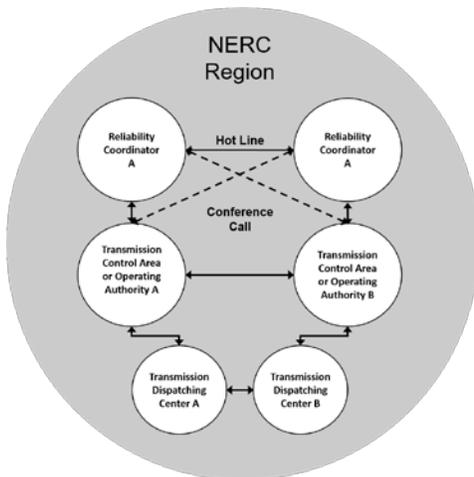


Figure 8-1. Emergency Communication Pathways

The Hot Line is typically between Reliability Coordinator and Reliability Coordinator. The conference call is usually requested by a Reliability Coordinator or Transmission Control Area or Operating Authority and will include several Reliability Coordinators, Transmission Control Areas, and Operating Authorities.

The AEP communication system was designed to allow control and operation of the geographically dispersed stations and plants from the System Control Center (SCC) and five Transmission Dispatch Centers (TDC). This system was designed to maintain reliable communication paths for the exclusive use of the SCC, TDCs and station personnel during emergencies. AEP East uses public switched communication networks for external communications. Internal communications is via company owned or leased facilities including microwave and fiber optic media.

## 8.1 Types of Communication Systems

### 8.1.1 800 Mhz Radio and Fiber Optics System

The backbone of the communication system is the AEP 800 Mhz radio and fiber optics system, its equipment, and path switching techniques.

The availability of 800 Mhz and fiber optics facilities during emergency situations is ensured by each microwave terminal and repeater station having an emergency power supply using a propane-powered automatic generator with sufficient fuel for three to fourteen days (typically seven days), or 24-hour emergency batteries.

### 8.1.2 Audinet System

The AEP Audinet system permits override on any congested tie-line group, disconnecting lower priority users. To minimize the possibility of overheating temperature-sensitive switches, air conditioning for the communication equipment rooms is supplied from the emergency generators during a power outage.

### 8.1.3 TDC to Plant Communication

Plant control rooms have a telephone console with a button dedicated to the Transmission Dispatching Centers (TDC) communication. At some TDCs, the telephone consoles have a button dedicated to each plant. All of the above equipment is battery-powered and continues to function if plant power is lost.

**Note:** Only Cook and Rockport plants have this console.

### 8.1.4 Satellite Communications

Satellite communication systems are also available in case of a loss of both the dedicated and the public telephone systems. Satellite Communications are the preferred backup systems for PJM as well as Market Operations.

### 8.1.5 SCADA Communications

The Eastern AEP SCADA host computers communicate with the substation RTUs via a communication front-end called the Station Data Gateway (SDG). The SDG can be located either local to the SCADA host or remote. Currently more SDGs exist than SCADA hosts to provide for sufficient diversity in case of the loss of an SDG.

The SDGs communicate with the SCADA host using the internal Transmission SCADA Network (TSN) via TCP/IP. The TSN provides redundant paths to each SDG to provide for a single contingency communications path loss. Between the redundant communication paths and diverse SDG locations, AEP constructed a robust network for RTU communications.



### 8.1.6 AEP Satellite Telephones

[REDACTED]

### 8.1.7 [REDACTED]

AEP/PJM		
***NO CONDUIT RULE APPLIES!!		
Plant	Unit	Talk Group
Amos	[REDACTED]	[REDACTED]
Big Sandy	[REDACTED]	[REDACTED]
Cardinal	[REDACTED]	[REDACTED]
Ceredo	[REDACTED]	[REDACTED]
Claytor	[REDACTED]	[REDACTED]
Clinch River	[REDACTED]	[REDACTED]
Dresden	[REDACTED]	[REDACTED]
Mitchell	[REDACTED]	[REDACTED]
Mountaineer	[REDACTED]	[REDACTED]
R.P. Mone	[REDACTED]	[REDACTED]
Smith Mountain	[REDACTED]	[REDACTED]

Table 8-1. AEP/PJM [REDACTED]

## 8.2 Decision Making/Collaboration

It is important to be aware and to determine when the transmission system is in a stressed or abnormal state. Reliability Coordinators, System Control Center Reliability Coordinators, and Transmission Dispatchers have the authority to implement emergency procedures to remedy emergency or abnormal conditions. These conditions should be reported and discussed with the System Control Center Reliability Coordinators, Reliability Coordinators, and local Engineering support staff as necessary, to help determine the nature and severity of the emergency or abnormal system and to further determine and agree on actions to take.

The urgency of a situation must be clearly communicated to assure timely decisions on actions to relieve the emergency or abnormal condition and to return the system to a normal or secure state. If an

emergency state, or near emergency state exists, then the necessary emergency communication contacts are made by the system experiencing the abnormal conditions. The notifications are made to those systems most affected by the abnormal conditions (see communications diagram), and the Reliability Coordinator can use the Reliability Coordinator Information System (RCIS) and the NERC Hot Line to inform other Reliability Coordinators of the situation.

In some instances a Hot Line may be set up between Reliability Coordinators, or a conference call may be initiated between the Reliability Coordinators and Transmission Control Areas or Operating Authorities affected by the abnormal system to discuss the nature of the emergency, what corrective actions are being taken to return the system to a normal state, and how long the system will be in the abnormal state.

### 8.3 Communication Failures

When problems are encountered with either the IT systems or Telecom infrastructure, the System Control Center Operators/Dispatchers are trained to contact the on-call support personnel, and/or the Network Operations Center (NOC) and/or the SCC IT support group. Once that call is made, the NOC and SCC IT support group are charged with the following responsibilities:

- Troubleshooting the issue
- Making appropriate support call-outs as required if they are not able to correct the problem
- Keeping all concerned parties apprised of the conditions as appropriate.

The NOC monitors AEP's internal communications system functions 24 hours a day/7 days a week (24/7) and advises the SCC and TDCs by email about planned or emergency outages that could affect telecommunications or SCADA facilities

When a critical Transmission RTU is lost, the Transmission Dispatcher may request that field personnel physically staff the station. The decision to staff the station must be coordinated with the SCC. The SCC notifies the regional Reliability Coordinator about the loss. The SCC, the On-Call Engineer, and the Reliability Coordinator evaluate the impact of the RTU loss to their respective EMS systems.

Refer to the Real-time Data Integrity Procedure on the TOPs ShareNow site for additional information about the detailed corrective actions the SCC follows.

### 8.4 Testing

800 Mhz communications is tested through normal usage or by a designated test.

Satellite communications are routinely tested with PJM and Market Operations.

## 9.0 Training Requirements

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The NERC Standards *EOP-005* and *PER-005* describe general training requirements for this plan. It is the responsibility of the various AEP training departments to develop and maintain an emergency operating training program for each area of responsibility.

## 9.1 System Operator Training

Purpose – Implement System Operator training to ensure plans, procedures, and resources are practiced/simulated to restore the electric system to a normal condition in the event of a partial or total shut down of the system.

Objectives – Learning objectives shall be based on this Emergency Operating Plan and/or company-specific reliability-related tasks performed by System Operators.

## 9.2 Requirements

System Operators shall receive emergency operations training applicable to its organization that reflects emergency operations topics, which include system restoration using drills, exercises, or other training required to maintain qualified personnel.

System Operators shall be trained in the implementation of the AEP System restoration plan. Such training shall include simulated exercises, if practicable.

Emergency Operations drills or simulations will be conducted each year to evaluate the effectiveness of the plan and to evaluate the knowledge of the SCC Reliability Coordinators and Transmission Dispatchers.

Documentation must be retained in the personnel training records that operating personnel were trained annually in the implementation of the plan and participated in restoration exercises.

## 10.0 Appendix A: AEP PJM Manual Load Shedding Guidelines

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The Manual Load Shedding Program is part of the Emergency Operating Plan as AEP may need to shed load to preserve the integrity of the interconnected system. This plan is usually activated for a Capacity Deficiency or a Transmission Emergency event. The AEP-Dominion Interface IROL procedure also includes load shedding as an option. Refer to the *IROL Relief Procedures AEPE PJM* document for additional details. It is located on the TOPs ShareNow site at 

Manual load shedding is performed in the AEP East/PJM footprint by arming the AEP Advanced Load Shedding (ALS) program which opens a pre-defined set of distribution feeder breakers to achieve a desired load shed objective. Once the objective is achieved, the program cycles through the breaker list by closing an open breaker followed by opening up another breaker. The program also monitors the total load shed against the load shed objective in order to continuously maintain the requested amount of load shed.

The Menu Advanced Load Shedding (MALS) displays on the WINSCADA ADX system shows the MVA load shed available for each area. The LOAD displayed in the figure below reflects the current Real-time area load.



**Figure 10-1. Example of MALS Display**

As an example using the MALS display, upon selecting the blue box in the **Main** column for OHIO, the program directs the user to the OHIO Control screen.



**Figure 10-2. ALSCA Display**

From a high level perspective, to shed load the TDC:

1. Enters the TARGET MVA load to shed.
2. Selects Enable Load Shed poke point.
3. Selects Initiate Load Shedding followed by Confirm.

The attached link to the ALS training video provides detailed step-by-step instructions for using the program.



Peak Non Coincidental MW Available on MALS for Calendar Year 2017						
ALS by TDC	CCTDC	CETDC	CWTDC	RNTDC	RSTDC	Total
MW's Available for ALS	3,525	984	2,000	2,608	1,902	11,020

**Table 10-1. Peak Non-Coincidental MW Available on MALS for Calendar Year 2017**

The following sequence shows the events that occur:

- The SCC issues a Manual Load Dump Warning. Each TDC arms a predetermined area to stand by for Manual Load Curtailment (if time permits).
- The SCC issues a Manual Load Dump Action. The SCC instructs each TDC to initiate Mandatory Load Curtailment on the requested amount of load in their specific area through the ALS program.

## 10.1 Load Shedding Criteria

The circuits are prioritized by the following guidelines. These guidelines have been approved by the AEP Legal department and meet the state requirements for the definition of Priority Use. AEP sheds Priority 3 circuits first, then Priority 2, and if more load is needed, Priority 1 load is shed. Stations that have at least 2 feeders where each feeder has at least 3,000 kW of load are selected. Stations with supervisory control and that meet the above criteria should be selected because they can be used in a computer program.

### 10.1.1 Priority

The feeders selected for use in controlled rotating blackouts are prioritized as follow:

<b>Priority 1</b>	Hospitals which shall be limited to major institutions providing critical care to patients.
<b>Priority 2</b>	Police, fire, communication services, water and sewer services, government, transportation, emergency medical services, alternate energy, and food services.
<b>Priority 3</b>	All other customers

**Table 10-2. Feeder Prioritization**

The following abbreviations can be used to describe the type of load on each circuit and in many cases the same circuit has several priority users.



Abbreviation	Definition
HOSP	Hospitals
LS	Life support equipment
POL	Police stations and government detention institutions
EMS	Emergency medical services
GOVT	Critical state and federal government facilities
FIRE	Fire stations
COM	Communication services such as telephone, radio, newspaper
WATER	Water and/or sewer services
TRAN	Transportation related services such as transit systems and major airport terminals
ALT ENG	Alternate energy source services such as IPP, Cogen
FOOD	Perishable food or medicine that represents substantially all of a customer's load

**Table 10-3. Load Definitions**

Due to the vast number of distribution circuits with life support, if a circuit only has life support on it, it should be classified as a Priority 3. The life support equipment is required to have a backup power supply and will ride through any of the abnormal circuit outages experienced every day. As such, the planned rotation does not pose a problem.

The amount of load to be shed in each district should be in the same proportion as the district load is to the Operating Company's peak summer/winter internal load. An estimate of what percentage the District load is to the Operating Company's peak summer/winter internal load needs to be determined and must be non-discriminatory.

### 10.1.2 Procedure

1. Estimate % **District** load as a percentage of Operating Companies peak summer/winter internal load and calculate target load for summer and winter.  
(Target Load = % District Load x Operating Company peak load x 25 %)
2. Determine type of load on each District's circuits and assign a **Priority** number.
3. Add the **Priority 3** circuit loads and compare to target load for the **District**.
4. If Priority 3 circuits are not enough, select Priority 2 circuits and recalculate.

5. If Priority 2 circuits are not enough, select Priority 1 circuits and recalculate.

NERC EOP 011-1 requirement R1.2.5 states in part:

Processes to prepare for and mitigate Emergencies including provisions for operator- controlled manual Load shedding that minimizes the overlap with automatic Load shedding and are capable of being implemented in a timeframe adequate for mitigating the Emergency.

AEP approaches this requirement by avoiding the addition of new manual Load shed facilities that have automatic Load shedding.