

CAPACITY AND ENERGY CONTROL PROGRAM

The Company's Capacity and Energy Control Program consists of:

- I. Procedures During Abnormal System Frequency
- II. Capacity Deficiency Program
- III. Energy Emergency Control Program

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A copy of the Company's Emergency Operating Plan was filed with the Kentucky Public Service Commission on May 1, 2008 in Administrative Case No. 353 in compliance with the Commission's Order dated January 20, 1995.

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I. PROCEDURES DURING ABNORMAL SYSTEM FREQUENCY

A. INTRODUCTION

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. The AEP program, which is in accordance with ECAR Document 3, is noted below.

B. PROCEDURES AEP/PJM

- 1. From 59.8 – 60.2 Hz to the extent practicable utilize all operating and emergency reserves. The manner of utilization of these reserves will depend greatly on the behavior of the System during the emergency. For rapid frequency decline, only that capacity on-line and automatically responsive to frequency (spinning reserve), and such items as interconnection assistance and load reductions by automatic means are of assistance in arresting the decline in frequency.

If the frequency decline is gradual, the Generation/Production Optimization Group, particularly in the deficient area, should invoke non-automatic procedures involving operating and emergency reserves. These efforts should continue until the frequency decline is arrested or until automatic load-shedding devices operate at subnormal frequencies.

- 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% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 4. At 59.4 Hz automatically shed an additional 5% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 5. At 59.3 Hz automatically shed an additional 5% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 6. At 59.1 Hz automatically shed an additional 5% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 7. At 59.0 Hz automatically shed an additional 5% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 8. At 58.9 Hz automatically shed an additional 5% of System internal load, excluding interruptibles, by relay action. (25 cycle, .42 sec. delay)
- 9. At 58.2 Hz automatically trip the D.C. Cook Nuclear Units 1 and 2.
- 10. At 58.0 Hz or at generator minimum turbine off-frequency value, isolate generating unit without time delay.

If at any time in the above procedure the decline in area frequency is arrested below 59.0 Hz, that part of the System in the low frequency area should shed an additional 10% of its initial load. If, after five minutes, this area has not returned the area frequency to 59.0 Hz or above, that part of the System shall shed an additional 10% of its remaining load to repeat in five-minute intervals until 59.0 Hz is reached. These steps must be completed within the time period specified in the Tariff Branch proposed upon the operation of generating units. (Cont'd on Sheet No. 3-2)

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CAPACITY AND ENERGY CONTROL PROGRAM (Cont'd)

II. CAPACITY DEFICIENCY PROGRAM

A. PURPOSE

To 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 Eastern System in the event of a capacity deficiency.

B. CRITERIA

The goals of AEP are to safely and reliably operate the interconnected network in order to avoid widespread system outages as a consequence of a major disturbance. Precautionary procedures including maintaining Daily Operating Reserves, as specified in ECAR document 2, and PJM Manual M13, will 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.

C. AEP EAST/PJM PROCEDURES

(note: the following section contains excerpts from PJM Manual – M13)

OVERVIEW

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 not considered in determining 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 (M-28)

The AEP System Control Center will be referred to as SCC and the AEP Production Optimization Group will be referred to as POG.

CAPACITY SHORTAGES

PJM is responsible for monitoring the operation of the PJM RTO, for declaring the existence of an Emergency, and for directing the operations of the PJM Member as necessary to manage, alleviate, or end an Emergency. PJM also is responsible for transferring energy on the PJM Members behalf to meet an Emergency. PJM is also responsible for agreements with other Control Areas interconnected with the PJM RTO for the mutual provision of service to meet an Emergency.

Exhibit 1 illustrates that there are three general levels of emergency actions for capacity shortages:

- alerts
- warnings
- actions

ALERTS

The intent of the alerts is to keep all affected system personnel aware of the forecast and actual system conditions. Alerts and cancellation thereof are broadcast on the "ALL-CALL" system and posted to selected PJM web sites to assure that all members receive the same information.

Alerts are issued in advance of a scheduled load period to allow sufficient time for members to prepare for anticipated initial capacity shortages.

(Cont'd on Sheet No.3-3)

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AEP East/PJM Procedures (cont'd)

Alerts(Cont'd)

Maximum Emergency Generation Alert

The purpose of the Maximum Emergency Generation Alert is to provide an early alert that system conditions may require the use of the PJM emergency procedures. It is implemented when Maximum Emergency Generation is called into the operating capacity.

Primary Reserve Alert

The purpose of the Primary Reserve Alert is to alert members of the anticipated shortage of operating reserve capacity for a future critical period. It is implemented when estimated operating reserve capacity is less than the forecast primary reserve requirement.

Voltage Reduction Alert

The purpose of the Voltage Reduction Alert is to alert members that a voltage reduction may be required during a future critical period. It is implemented when the estimated operating reserve capacity is less than the forecast spinning reserve requirement.

Voluntary Customer Load Curtailment Alert

The purpose of the Voluntary Customer Load Curtailment Alert is to alert members of the probable future need to implement a voluntary customer load curtailment. It is implemented whenever the estimated operating reserve capacity indicates a probable future need for voluntary customer load curtailment.

Warnings

Warnings are issued during present operations to inform members of actual capacity shortages or contingencies that may jeopardize the reliable operation of the PJM RTO. The intent of warnings is to keep all affected system personnel aware of the forecast and/or actual status of the PJM RTO. All warnings and cancellations are broadcasted on the "ALL-CALL" system and posted to selected PJM web sites to assure that all members receive the same information.

Primary Reserve Warning

The purpose of the Primary Reserve Warning is to warn members that the available primary reserve is less than required and present operations are becoming critical. It is implemented when available primary reserve capacity is less than the primary reserve requirement, but greater than the spinning reserve requirement, after all available secondary reserve capacity (except restricted maximum emergency capacity) is brought to a primary reserve status and emergency operating capacity is scheduled from adjacent systems.

Voltage Reduction Warning & Reduction of Non-Critical Plant Load

The purpose of the Voltage Reduction Warning & Reduction of Non-Critical Plant Load is to warn members that the available spinning reserve is less than the Spinning Reserve Requirement and that present operations have deteriorated such that a voltage reduction may be required. It is implemented when the available spinning reserve capacity is less than the spinning reserve requirement, after all available secondary and primary reserve capacity (except restricted maximum emergency capacity) is brought to a spinning reserve status and emergency operating capacity is scheduled from adjacent systems.

Manual Load Dump Warning

The purpose of the Manual Load Dump Warning is to warn members of the increasingly critical condition of present operations that may require manually dumping load. It is issued when available primary reserve capacity is less than the largest operating generator or the loss of a transmission facility jeopardizes reliable operations after all other possible measures are taken to increase reserve. The amount of load and the location of areas(s) are specified.

Actions

The PJM RTO is normally loaded according to bid prices; however, during periods of reserve deficiency, measures must be taken to maintain system reliability. These measures involve:

- Loading generation that is restricted for reasons other than cost
- Recalling non-capacity backed off-system sales
- Purchasing emergency energy from participants / surrounding pools
- Load relief measures

(Cont'd on Sheet No. 3-4)

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CAPACITY AND ENERGY CONTROL PROGRAM (Cont'd)

AEP East/PJM Procedures (Cont'd)

Actions (Cont'd)

The procedures to be used under these circumstances are described in the general order in which they are applied. Due to system conditions and the time required to obtain results, PJM dispatcher may find it necessary to vary the order of application to achieve the best overall system reliability. Issuance and cancellation of emergency procedures are broadcast over the "ALL-CALL" and posted to selected PJM web sites. Only affected systems take action. PJM dispatcher broadcasts the current and projected PJM RTO status periodically using the "ALL-CALL" during the extent of the implementation of the emergency procedures.

Maximum Emergency Generation

The purpose of the Maximum Emergency Generation is to increase the PJM RTO generation above the maximum economic level. It is implemented whenever generation is needed that is greater than the highest incremental cost level.

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Load Management Curtailments (ALM)

Steps 1 and 2 (PJM Control)

The purpose of the Load Management Curtailments, Steps 1 and 2, is to provide additional load relief by using PJM controllable load management programs. Steps 1 and 2 are differentiated only by the expected time to implement. Load relief is required after initiating Maximum Emergency Generation.

Step 1: Short Time Frame to Implement (1 Hour or Less)

- PJM dispatcher requests members to implement Load Management Curtailment, Step 1.

Step 2: Long Time Frame To Implement (Greater Than 1 Hour)

- PJM dispatcher requests members to implement Load Management Curtailment, Step 2.

Steps 3 and 4 (SCC Control)

The purpose of the Local Control Center Programs of Load Management Curtailments, Steps 3 and 4, is to provide additional load relief by requesting use of Local Control Center load management programs.

Load Reduction Program

The purpose of the Load Reduction Action is to request end-use customers to reduce load during emergency conditions.

Voltage Reduction

The purpose of Voltage Reduction during capacity deficient conditions is to reduce load to provide a sufficient amount of reserve to maintain tie flow schedules and preserve limited energy sources. A curtailment of non-essential building load is implemented prior to or at this same time as a Voltage Reduction Action. It is implemented when load relief is still needed to maintain tie schedules.

Note: Voltage reductions can also be implemented to increase transmission system voltage.

Note: Curtailment of non-essential building load may be implemented prior to, but not later than, the same time as a voltage reduction.

Curtailment of Non-Essential Building Load

The purpose of the Curtailment of Non-Essential Building Load is to provide additional load relief, to be requested prior to, but no later than the same time as a voltage reduction.

(Cont'd on Sheet No. 3-5)

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CAPACITY AND ENERGY CONTROL PROGRAM (Cont'd)

		Communications	Description	
Alert	Maximum Emergency Generation	PJM-POG via All-Call PJM-SCC via All-Call SCC-TDC	SCC/POG review scheduled or actual maintenance affecting capacity or critical transmission to determine if it can be deferred or cancelled	EEA 1
	Primary Reserve	PJM-POG via All-Call PJM-SCC via All-Call SCC-TDC	(Same as above)	
	Voltage Reduction	PJM-SCC via All-Call SCC-TDC	SCC/TDC to identify stations for Voltage Reduction	
	Voluntary Customer Load Curtailment	PJM-POG via All-Call PJM-SCC via All-Call	Not Applicable	
Warning	Primary Reserve	PJM-POG via All-Call PJM-SCC via All-Call SCC-TDC	SCC/POG ensure that all deferrable maintenance or testing affecting capacity or critical transmission is halted.	
	Voltage Reduction & Reduction of Non-Critical Plant Load	PJM-POG via All-Call PJM-SCC via All-Call SCC-TDC	SCC to inform TDC to man Voltage Reduction Stations & prepare for Voltage Reduction	POG to reduce plant load. (See Table III-4)
	Manual Load Dump	PJM-SCC via All-Call SCC- POG-Environmental Services SCC-TDC-DDC	Lifting of Environmental Restrictions (See Table III-5)	Manual & Automatic Load Shedding
		Make preparations for a Public Appeal if one becomes necessary.	<ul style="list-style-type: none"> a. Obtain permission to exceed opacity limits b. Obtain permission to exceed heat input limits c. Obtain permission to exceed river temperature limits 	SCC/TDC will review local computer procedures and man manual load shedding stations
Action	Maximum Emergency Generation	PJM-POG via All-Call PJM-SCC via All-Call	Supplemental Oil & Gas Firing; Operate Generator Peakers; Emergency Hydro; Extra Load Capability	See Table III-3
	Load Management Curtailment (ALM)	PJM-SCC via All-Call SCC - POG	Step 3 - 1267 Mws - 1 hr, 249 Mws - 2 hr	EEA 2 (DOE Report)
	Load Reduction Program	PJM-SCC via All-Call	Not Applicable	
	Voltage Reduction	PJM-SCC via All-Call SCC -TDC & SCC - POG	Initiate Voltage Reduction - AEP/PJM - 64 Mws	
	Curtailment of Non-Essential Building Load	PJM-POG via All-Call PJM-SCC via All-Call SCC- Building Services	Initiate curtailment of AEP building load - 4.4 Mws	Issued approx. same time as Voltage Reduction
	Voluntary Customer Load Curtailment	PJM-POG via All-Call PJM-SCC via All-Call	Not Applicable	EEA 3 (DOE Report)
	Public Appeal (may be issued at any stage of the Action items)	SCC - Corporate Communications	a. Radio and TV alert to general public	2% of AEP Internal Load
		SCC - Customer Services SCC - POG	b. Call to Industrial and Commercial Customers	1276 Mws - 1 hr + 320 Mws - 2 hr
		SCC - TDC	c. Municipal and REMC Customers	7% of Cust. Load
	Manual Load Dump	PJM-SCC via All-Call SCC-POG-Environmental Services SCC-TDC-DDC	PJM Allocation based on zones	KENTUCKY PUBLIC SERVICE COMMISSION
		a. Lift Environmental Restrictions on Units	JEFF R. DEROUEN, EXECUTIVE DIRECTOR regains curtailed (generation)	
		b. Selected distribution curtailment	TARIFF BRANCH Execute MLD	

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CAPACITY AND ENERGY CONTROL PROGRAM(Cont'd)

III. **ENERGY EMERGENCY CONTROL PROGRAM(Cont'd)**

B. **PROCEDURES (Cont'd)**

C. To be initiated -- in the order indicated below -- when system fuel supplies are decreased to 50% of normal target days' operation of coal-fired generation plants and a continued downward trend in coal stocks is anticipated:

1. Discontinue emergency deliveries to neighboring utilities unless the receiving utility agrees to return like quantities of energy within seven days.
2. Request all customers, retail as well as wholesale, to reduce their nonessential use of electric energy by 100%.
3. Request, through mass communication media, curtailment by all other customers a minimum of 15% of their electric use. These uses include lighting, air-conditioning, heating, manufacturing processes, cooking, refrigeration, clothes washing and drying and any other loads that can be curtailed.
4. All customers will be advised of the mandatory program specified below in D.

D. To be initiated when system fuel supplies are decreased to 40% of normal target days' operation of coal-fired generation and a continued downward trend in coal stocks is anticipated:

1. Implement procedures for curtailment of service to all customers to a minimum service level that is not greater than that required for protection of human life and safety, protection of physical plant facilities and employees' security. This step asks for curtailment of the maximum load possible without endangering life, safety and physical facilities.
2. All customers will be advised of the mandatory program specified below in E.

E. To be initiated when system fuel supplies are decreased to 30% of normal target days' operation of coal-fired generation and a continued downward trend in coal stocks is anticipated:

Implement procedures for interruption of selected distribution circuits on a rotational basis, while minimizing -- to the extent practicable -- interruption to facilities that are essential to the public health and safety. (See Section II, Step 14.)

F. The Energy Emergency Control Program will be terminated when:

1. The AEP System's remaining days of operation of coal-fired generation is at least 40% of normal target days' operation, and
2. Coal deliveries have been resumed, and
3. There is reasonable assurance that the AEP System's coal stocks are being restored to adequate levels.

With regard to mandatory curtailments identified in Items C, D, and E above, the Company proposes to monitor compliance after the fact. A customer exceeding his electric allotment would be warned to curtail his usage or face, upon continuing noncompliance and upon one day's actual written notice, disconnection of electric service for the duration of the energy emergency.

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