

COMMONWEALTH OF KENTUCKY
BEFORE THE ENERGY REGULATORY COMMISSION

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In the Matter of

KENTUCKY UTILITIES COMPANY AND)
LOUISVILLE GAS AND ELECTRIC)
COMPANY CONTINGENCY PLANS FOR)
EMERGENCY PROCEDURES DURING AN)
ENERGY SHORTAGE)

ADMINISTRATIVE
CASE NO. 231

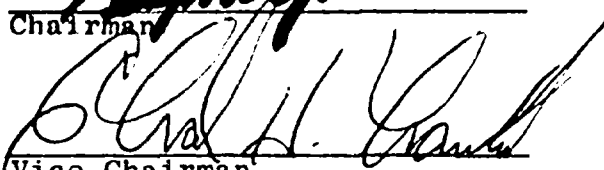
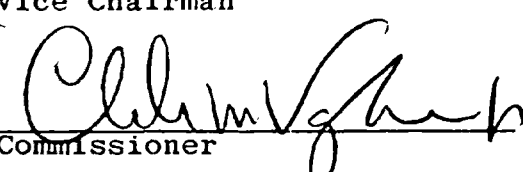
O R D E R

The Commission in accordance with the provisions of KRS 278.040 and upon its own motion finds that it is prudent and desirable for electric generating and transmission utilities to have emergency procedures available for implementation prior to the onset of an energy shortage and furthermore it is desirable, insofar as possible, that all utilities with similar operating and service characteristics should have similar emergency procedures.

IT IS THEREFORE ORDERED that within sixty (60) days from the date of this Order that Kentucky Utilities Company (KU) and Louisville Gas and Electric Company (L.G.&E.) shall submit their plan of emergency procedures to be followed during any energy shortage. In preparation of the emergency procedures submitted, the utility shall consider the appropriateness of the use of the procedures and substance contained in Attachment No. 1, which is a part of this Order.

Done at Frankfort, Kentucky, this 14th day of October, 1980.

ENERGY REGULATORY COMMISSION


Chairman

Vice Chairman

Commissioner

ATTEST:

Secretary

ATTACHMENT NO. 1

TO AN ORDER OF THE ENERGY REGULATORY COMMISSION

IN ADM. CASE NO. 231 DATED: OCTOBER 14, 1980

ENERGY EMERGENCY CONTROL PROGRAM

Purpose -- To provide a plan for reducing the consumption of electric energy on the Company (Company) system in the event of a severe coal shortage, such as might result from a general strike in the coal mines.

For the purpose of this Program, the following priority levels have been established:

- I. Essential Health and Safety Uses -- as defined in Appendix B
- II. Residential Use
- III. Commercial and Industrial Uses
- IV. Nonessential Uses -- as defined in Appendix C

It is the intent of this Program that the Company's wholesale customers will be treated in a manner consistent with the curtailment procedures applicable to the Company's retail customers. Implementation in the case of wholesale customers will be in accordance with the curtailment provision contained in the service agreement between the parties or the applicable tariff.

Procedures -- In the event of a potential severe coal shortage, such as one resulting from a general coal strike the Utility shall make an inventory of their fuel stock to determine the quantity and quality of the recoverable fuel. This inventory shall be completed within the thirty (30) day period prior to the anticipated start of the emergency and the following steps will be implemented. These steps will be carried out to the extent not prohibited by contractual commitments or by order of the regulatory authorities having jurisdiction. The "days' operation" referred to below will be calculated in accordance with Appendix A.

- I. To be initiated when fuel supplies are decreased to 50 days' operation of coal-fired generation and a continued downward trend in coal stocks is anticipated:
 - 1) Optimize the use of non-coal-fired generation to the extent possible.
 - 2) For individual plants significantly under 50 days' supply, modify economic dispatching procedures to conserve coal.
 - 3) If necessary, discontinue economy sales to neighboring utilities.
 - 4) Curtail the use of energy in all company offices, plants, etc.

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

- 1) At coal-fired generating plants, substitute the use of oil for coal as permitted by plant design, oil storage facilities and oil availability.
- 2) Discontinue all economy sales and all short-term sales to neighboring utilities.
- 3) Limit emergency deliveries to neighboring utilities to situations where regular customers of such utilities would otherwise be dropped or where the receiving utility agrees to return like quantities of energy within 14 days.
- 4) Curtail electric energy consumption by customers on interruptible contracts to a maximum number of hours of use per week as negotiated within the context of the contract provisions.
- 5) Purchase energy from neighboring systems to the extent practicable.
- 6) Purchase energy from industrial customers with generation facilities to the extent practicable.
- 7) Through use of the news media and direct customer contact, appeal to all customers, both retail and wholesale, to voluntarily reduce their use of electric energy as much as possible, and in any case endeavor to reduce the nonessential usage of electricity (Priority Level IV) by at least 25%.
- 8) Reduce voltage around the clock to the extent feasible.
- 9) The Company shall advise customers of the nature of the mandatory program to be introduced in Section III below through direct contact and mass media, and establish an effective means of answering specific customer inquiries concerning the impact of the mandatory program on his electricity availability.

III. To be initiated -- in the order indicated below -- when fuel supplies are decreased to 30 day's operation of coal-fired 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 7 days.

- 2) Implement mandatory curtailment of electric service to all customers as indicated below:
 - (a) Priority Level IV - 100%
 - (b) Priority Level III - 25% (based on the "monthly base period use" as defined in Appendix D)
 - (c) Priority Level II - 15%.
 - 3) The Company shall advise all customers of the mandatory program specified in Section IV below.
- IV. To be initiated when fuel supplies are decreased to 20 days' operation of coal-fired generation and a continued downward trend in coal stocks is anticipated:
- 1) Implement mandatory curtailment of electric service to all priority levels (including Priority Level I) at a minimum service level which is not greater than that required for protection of human life and safety, protection of physical plant facilities, and employees' security.
 - 2) The Company shall advise all customers of the mandatory program specified in Section V below.
- V. To be initiated as a measure of last resort when fuel supplies are decreased to 15 days' operation of coal-fired generation and a continued downward trend in coal stocks is anticipated:
- 1) Implement procedures for interruption of selected distribution circuits on a rotational basis, while minimizing -- to the extent practicable -- interruption to Priority Level I.

With regard to mandatory curtailments identified in Sections III, IV and V above, the Company proposes to monitor compliance after the fact, to the extent feasible, as approved by the Commission. A customer exceeding his electric energy allotment would be warned to curtail his usage or face, upon continuing noncompliance and upon one day's written notice, disconnection of electric service for the duration of the energy emergency.

Termination of Energy Emergency -- The Energy Emergency Control Program shall be terminated upon notice to the Commission, when (a) the remaining days of operation of coal-fired generation is at least 20 days, (b) coal deliveries have been resumed, and (c) there is reasonable assurance that the coal stocks are being restored to adequate levels.

APPENDIX "A"

The procedure described herein will be used to project the day's coal supply remaining for a system or group of systems and to determine the dispatch required to obtain the maximum days' burn from that supply.

Data Required

1. All long-time unit deratings and partial outages
2. The weighted average net heat rate (BTU/KWH) of the units within each plant (weighted by unit capability)
3. The recoverable inventory of coal in storage at each plant (TONS)
4. The heat value (BTU/lb) of the coal in storage at each plant
5. The system's projected average daily coal-fired generation requirements for the coming 60 days (MWH/DAY)
6. Additional output obtainable at each plant by the firing of supplemental fuel; i.e., oil, natural gas, propane

Algorithm Used

1. A burn factor (TON/MWH) is calculated for each plant based on the weighted average heat rate of the plant and the heat value of the coal in storage.

$$\text{TON/MWH} = \frac{\text{BTU/KWH} \times 1000 \text{ KWH/MWH}}{\text{BTU/lb} \times 2000 \text{ LB/TON}}$$

2. The maximum 24 hour MWH output of each plant is calculated considering long term deratings and partial outages.

$$\text{MAX MWH/DAY} = (\text{PLANT CAP-DERATE}) \times 24$$

3. The MWH/DAY output obtainable from the coal in storage at each plant is calculated for 10 days, 15 days, and so on to 75 days. If supplemental fuel output is available, it is to be included.

$$\text{MWH/DAY} = \frac{\text{TONS IN STORAGE}}{(\text{TONS/MWH}) \times \text{DAYS}} + \text{SUPP. MWH/DAY}$$

4. After each calculation of MWH/DAY is made, the value is compared to the MAX MWH/DAY. If the value calculated is greater, the MWH/DAY for that number of days is set equal to the MAX MWH/DAY.
5. The MWH/DAY obtainable for 10 days from each of the systems' plants is summed, then from each of the plants for 15 days, 20 days, and so on. The value of each summation is the MWH/DAY output of the system's coal-fired generation obtainable for that number of days.
6. The system's projected daily average coal-fired generation requirement in MWH/DAY is obtained by estimating the system's total MWH internal load requirement, minus firm purchase, plus firm sales, minus generation from non-critical fueled units and dividing the value obtained by the number of days over which the estimate was made.

$$\text{MWH/DAY} = \frac{\text{LOAD} + \text{SALES} - \text{PURCHASE} - \text{NON-CRITICAL FUEL}}{\text{DAYS}}$$

7. The MWH/DAY generation requirement determined in Step 6 is then compared to the total system MWH/DAY obtainable for specified days as determined in Step 5. The days remaining coal supply are the days at which the MWH/DAY generation requirement equals the MWH/DAY obtainable. If the indicated days remaining supply differs significantly from the number of days used to obtain the average MWH/DAY in Step 6, Step 6 should be repeated.

To realize the days remaining coal supply determined in Step 7, a system's generating plants must be dispatched such that each plant's daily net energy output (MWH/DAY) when averaged over a calendar week approximately equals the MWH/DAY obtainable from that plant for the number of days determined to be the system's days coal supply. How such a dispatch is affected is best determined by each system.

Jointly owned plants will be treated on a pro rata basis. Each participant will report his share of the plant's total capacity and fuel supply as if it were at a separate location. The average MWH/DAY output requirement and days remaining coal supply of each participant's share will be determined separately.

Example:

As an example, consider a 1400 MW installed capacity hypothetical system. The system's projected average internal energy requirements are 26,400 MWH/DAY. External firm sales obligations are 1,200 MWH/DAY. The system has four generating plants, one of which is a 500 MW nuclear capable of sustained operation of 90 per cent capacity factor. The three coal plants have the capability rating, coal inventory, and heat rate shown below. No condition deratings are considered. The coal in storage at all three plants is assumed to have a heat value of 11,000 BTU/lb.

COAL FIRED PLANTS

<u>Plant</u>	<u>MW Net Capability</u>	<u>Max MWH/DAY</u>	<u>Tons in Storage</u>	<u>Heat Rate BTU/KWH</u>	<u>TON/MWH</u>
1	500	12,000	200,000	9,500	.4318
2	300	7,200	75,000	10,000	.4545
3	100	2,400	30,000	10,500	.4773

From the above data, the MWH/DAY output of each plant is calculated for 5-day increments of days fuel supply remaining and totaled for the system.

MWH/DAY FOR DAYS REMAINING

<u>Plant</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>	<u>50</u>
1	12,000	12,000	12,000	11,579	10,292	9,263
2	6,600	5,500	4,714	4,125	3,667	3,300
3	2,400	2,095	1,796	1,571	1,397	1,257
TOTAL	21,000	19,595	18,510	17,275	15,356	13,820

The energy requirement on the coal-fired plants is:

System internal energy requirement	26,400 MWH/DAY
Firm sale obligation	1,200 MWH/DAY
Nuclear unit output (500 x 24 x .9)	-10,800 MWH/DAY
Coal-fired output required	16,800 MWH/DAY

The coal-fired energy requirement lies between 17,275 MWH/DAY for 40 days and 15,256 MWH/DAY for 45 days. By interpolation the value for 16,800 MWH/DAY is found to be 41 days. To satisfy the loading criteria each plant's average daily output should be:

Plant 1	11,250 MWH/DAY - 93% CAPACITY FACTOR
Plant 2	4,025 MWH/DAY - 56% CAPACITY FACTOR
Plant 3	1,525 MWH/DAY - 64% CAPACITY FACTOR

APPENDIX "B"

ESSENTIAL HEALTH AND SAFETY USES

Essential health and safety uses given special consideration in these procedures shall, insofar as the situation permits, include the following types of use and such other uses which the Commission may subsequently identify:

- (a) "Hospitals", which shall be limited to institutions providing medical care to patients.
- (b) "Life Support Equipment", which shall be limited to kidney machines, respirators, and similar equipment used to sustain the life of a person.
- (c) "Police Stations and Government Detention Institutions", which shall be limited to essential uses required for police activities and the operation of facilities used for the detention of persons. These uses shall include essential street, highway and signal-lighting services.
- (d) "Fire Stations", which shall be limited to facilities housing mobile fire-fighting apparatus.
- (e) "Communication Services", which shall be limited to essential uses required for telephone, telegraph, television, radio and newspaper operations.
- (f) "Water and Sewage Services", which shall be limited to essential uses required for the supply of water to a community, flood pumping and sewage disposal.
- (g) "Transportation and Defense-related Services", which shall be limited to essential uses required for the operation, guidance control and navigation of air, rail and mass transit systems, including those uses essential to the national defense and operation of state and local emergency services.
- (h) "Other Energy Source Services", which shall be limited to essential uses required for the production, transportation, transmission and distribution -- for fuel -- of natural or manufactured gas, coal, oil or gasoline.
- (i) "Perishable Food or Medicine", which shall be limited to refrigeration for the storage and preservation of perishable food or medicine, when that use is substantially all of the customer's load.

Although these types of uses will be given special consideration when implementing the manual load-shedding provisions of this procedure, these customers are encouraged to install emergency generation equipment if continuity of service is essential. In case of customers supplied from two utility sources, only one source will be given special consideration. Also, any other customers who, in their opinion, have critical equipment should install emergency generation equipment.

APPENDIX "C"

NONESSENTIAL USES

The following and similar types of uses of electric energy and others which the Commission may subsequently identify shall be considered nonessential for all customers:

- (a) Outdoor flood and advertising lighting, except for the minimum level to protect life and property, and a single illuminated sign identifying commercial facilities when operating after dark.
- (b) General interior lighting levels greater than minimum functional levels.
- (c) Show-window and display lighting.
- (d) Parking-lot lighting above minimum functional levels.
- (e) Energy use greater than that necessary to maintain a temperature of not less than 78 degrees during operation of cooling equipment and not more than 65 degrees during operation of heating equipment.
- (f) Elevator and escalator use in excess of the minimum necessary for non-peak hours of use.
- (g) Energy use greater than that which is the minimum required for lighting, heating or cooling of commercial or industrial facilities for maintenance cleaning or business-related activities during non-business hours.

APPENDIX "D"

MONTHLY BASE PERIOD

"Monthly Base Period Use" is defined as the customer's usage during the corresponding monthly billing cycle of the twelve monthly billing periods immediately prior to December 31 of the year immediately preceding the current year, adjusted to reflect any increases or decreases of load in the most recent three-month period due to the installation or removal of equipment or a change in operating rate as computed in the formula.

Upon application by the customer and agreement by the Company, a one-time adjustment of the monthly energy use of the twelve-month billing period ending December 31 of the year immediately preceding the current year, or an adjustment of the prior three-month usage (PQKWH), will be made to correct any abnormalities of energy use resulting from such events as strikes and breakdowns of major equipment that may have occurred during the period in question. For customers connected after December 31 of the year preceding the current year by one year, base period energy use will be negotiated between the customer and the Company.

$$AMBP = CM \times \frac{PQ}{BPQ}$$

WHERE:

AMBP = Adjusted Monthly Base Period (KW or KWH).

CM = Corresponding month during the year immediately preceding the current year.

PQ = Average use (KW or KWH) for the second, third and fourth monthly billing periods immediately prior to the date of the curtailment order. Should a curtailment be extended so that one of the three monthly billing periods reflects usage under a curtailment period, the actual billing for that month is replaced with the AMBP previously calculated for that month.

BPQ = Average of corresponding three monthly billings prior to CM.

Example: (Curtailment ordered during month of May 1977)

1st Curtailment Month

Since the April 1977 billing may not always be available, then for uniformity to all customers -- from the time curtailment is ordered until the May meter reading date:

$$\text{May '77} = \frac{(\text{Jan., Feb., March}) \text{'77} \times \text{May '76}}{(\text{Jan., Feb., March}) \text{'76}}$$

2nd Curtailment Month

$$\text{June '77} = \frac{(\text{Feb.}, \text{Mar.}, \text{April}) \text{'77} \times \text{June '76}}{(\text{Feb.}, \text{Mar.}, \text{April}) \text{'76}}$$

3rd Curtailment Month

Since May '77 will reflect electric use under a curtailment, May '77 will be replaced with May '77 as calculated in the 1st Curtailment Month:

$$\text{July '77} = \frac{(\text{Mar.}, \text{Apr.}, \text{May}) \text{'77} \times \text{July '76}}{(\text{Mar.}, \text{Apr.}, \text{May}) \text{'76}}$$

NOTE: The nomenclature for any one billing period is determined by the last reading date in the period, i.e., a bill from April 2 to May is considered the May billing period.