

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

APR 22 1986

Mr. Ken Ohl
 John Hopkins University
 School of Hygiene and Public Health
 615 North Wolfe Street
 Baltimore, Maryland 21205

Dear Mr. Ohl:

This letter is in response to your inquiry regarding the definitions of network and radial transformers referenced in the July 17, 1985 PCB Transformer Fires Rule.

As you know, the use of network PCB Transformers with higher secondary voltages (secondary voltages equal to or greater than 480 volts, including 480/277 volt systems) in or near commercial buildings is prohibited after October 1, 1990. In addition, as of October 1, 1990, all radial PCB Transformers and lower secondary voltage network PCB Transformers (network transformers with secondary voltages below 480 volts) in use in or near commercial buildings must be equipped with enhanced electrical protection. Therefore, because it is necessary to know what type of transformer you possess to properly comply with the regulations, I will attempt, as per your request, to define radial and network transformers.

First, a radial transformer is a unit substation which has a single stepdown transformer and which has an outgoing section for the connection of one or more outgoing radial (stub end) feeders. Second, radial transformers are typically equipped with overcurrent protection on the high voltage side (or primary side) in the form of either a current-limiting fuse or circuit breaker, and often with fuses and/or circuit breakers on the low voltage side or the load side.

There are two types of network transformer installations: distribution networks and spot networks. A distribution network transformer is a unit substation which has a single stepdown transformer having its outgoing side connected to a bus through a circuit breaker equipped with relays which are arranged to trip the circuit breaker on reverse power flow to the transformer and to reclose the circuit breaker upon the restoration of the the correct voltage, phase angle, and phase sequence at the

CONCURRENCES

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transformer secondary. The bus has one or more outgoing radial (stub-end) feeders and one or more tie connections to a similar unit substation.

A spot network transformer is a unit substation which has two stepdown transformers, each connected to an incoming high-voltage circuit. The outgoing side of each transformer is connected to a common bus through circuit breakers equipped with relays which are arranged to trip the circuit breaker on reverse power flow to the transformer and to reclose the circuit breaker upon the restoration of the correct voltage, phase angle and phase sequence at the transformer secondary. The bus has one or more outgoing radial (stub end) feeders. In addition, network transformers are not typically equipped with current-limiting or energy limiting devices on the primary circuit. Current-limiting fuses are used in the secondary of higher secondary voltage network transformers (in the services and in the network protector). Unlike radial transformers, network transformers are equipped with network protectors, which are circuit breakers located on the secondary side of network transformers. Most high secondary volt network transformers are configured in a spot network configuration.

I have enclosed diagrams of the different types of radial configurations and a diagram of the spot network configuration. These diagrams were submitted to the rulemaking record by the General Electric Company. These should prove helpful in distinguishing radial installations from spot network installations.

If you have any further questions, or need further assistance, please feel free to call me at (202) 382-3965 or Robin Lancaster at (202) 382-3788.

Sincerely,

Denise Keehner, Chief
Regulatory Section

Enclosure

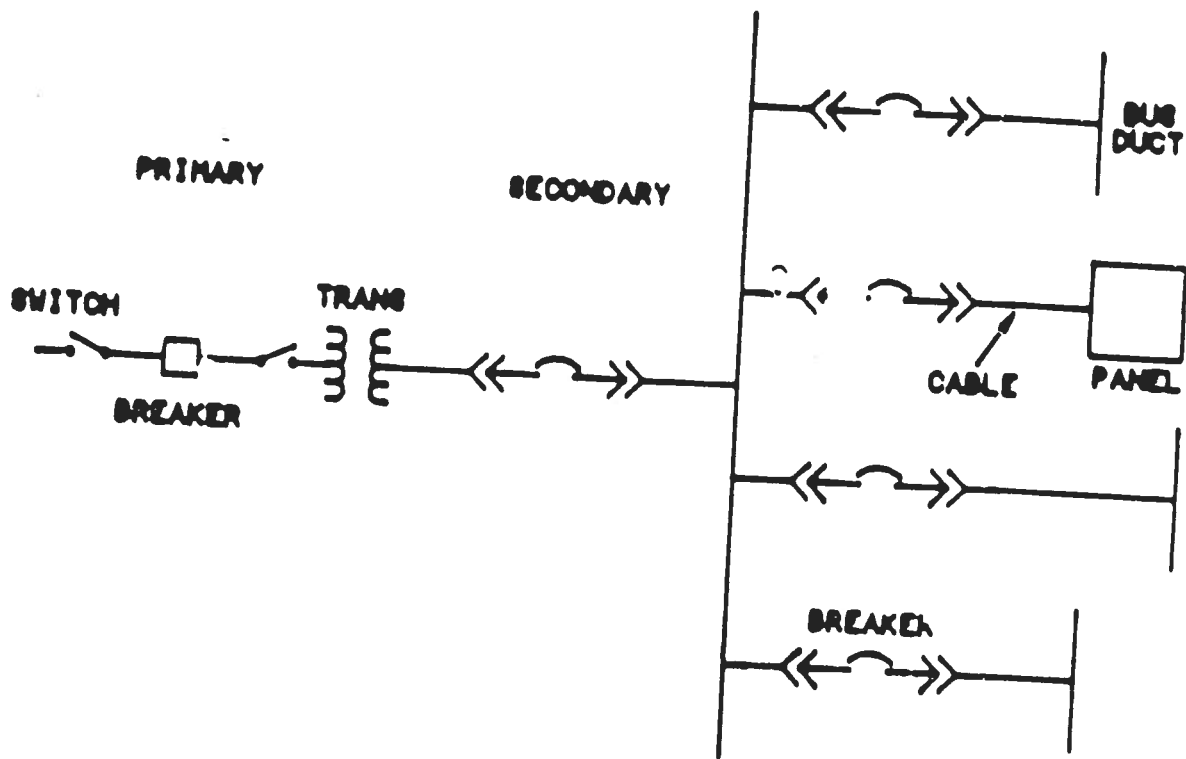


FIG. 1
SIMPLE RADIAL SYSTEM

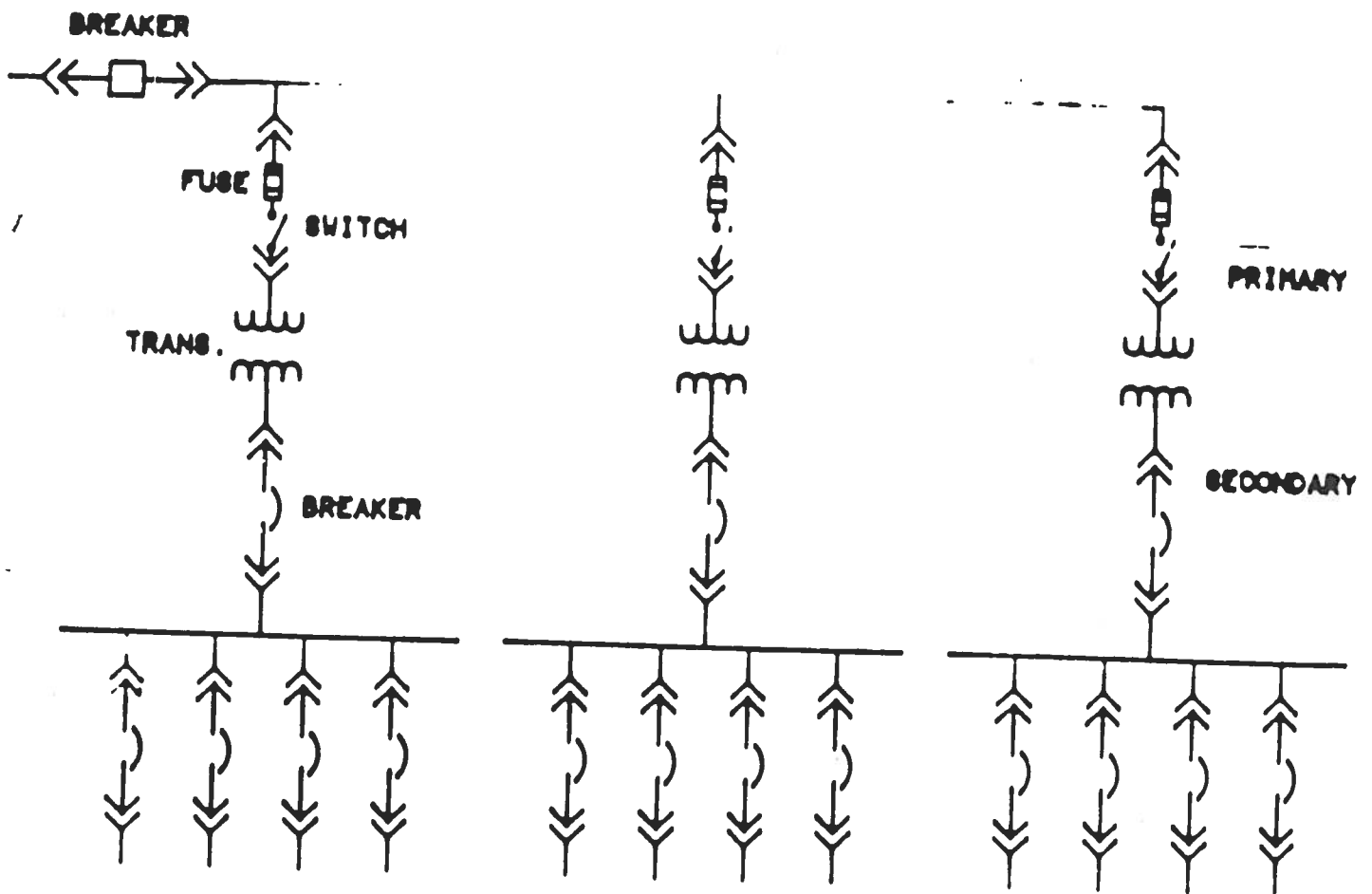


FIG. 2
EXPANDED RADIAL SYSTEM

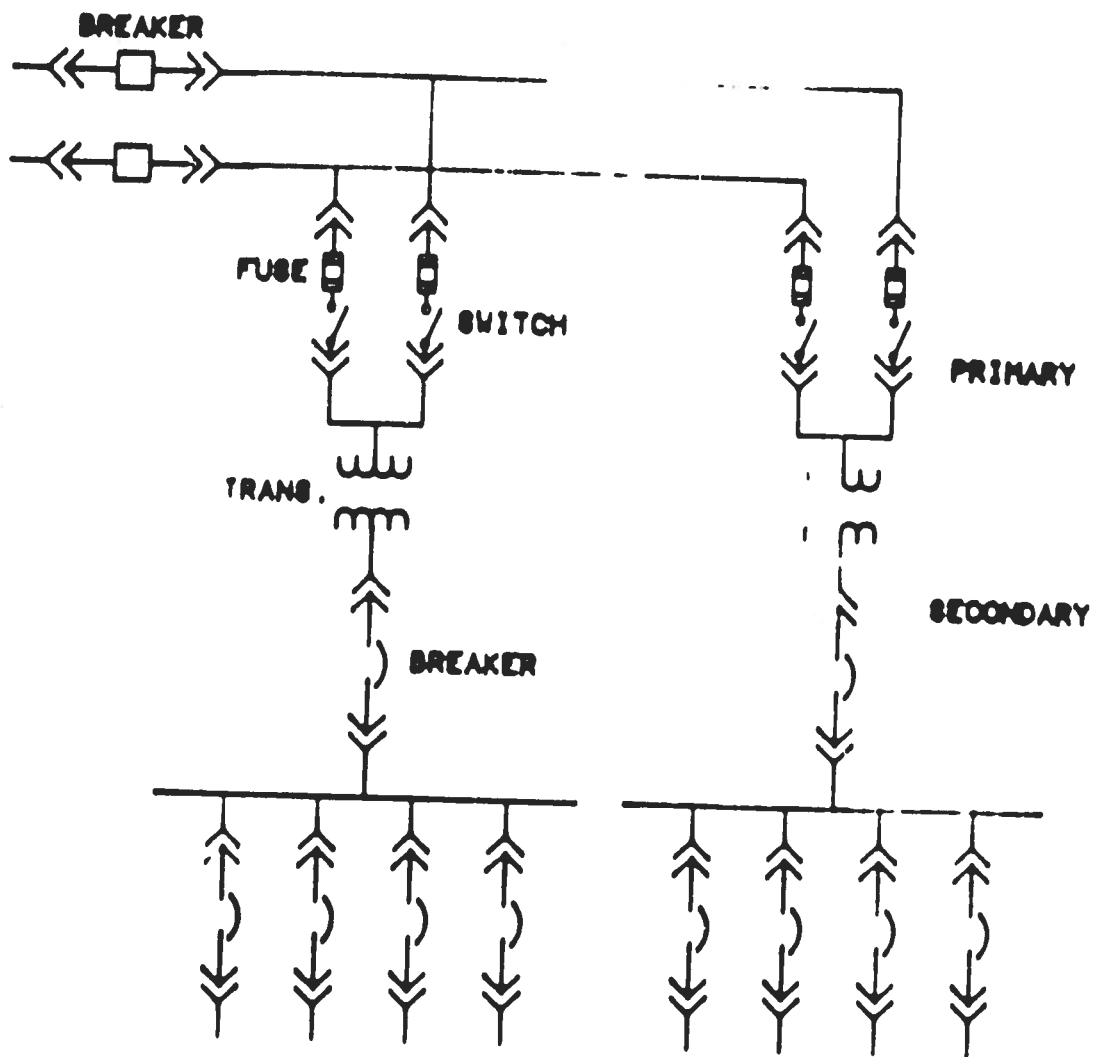


FIG. 3
PRIMARY SELECTIVE SYSTEM

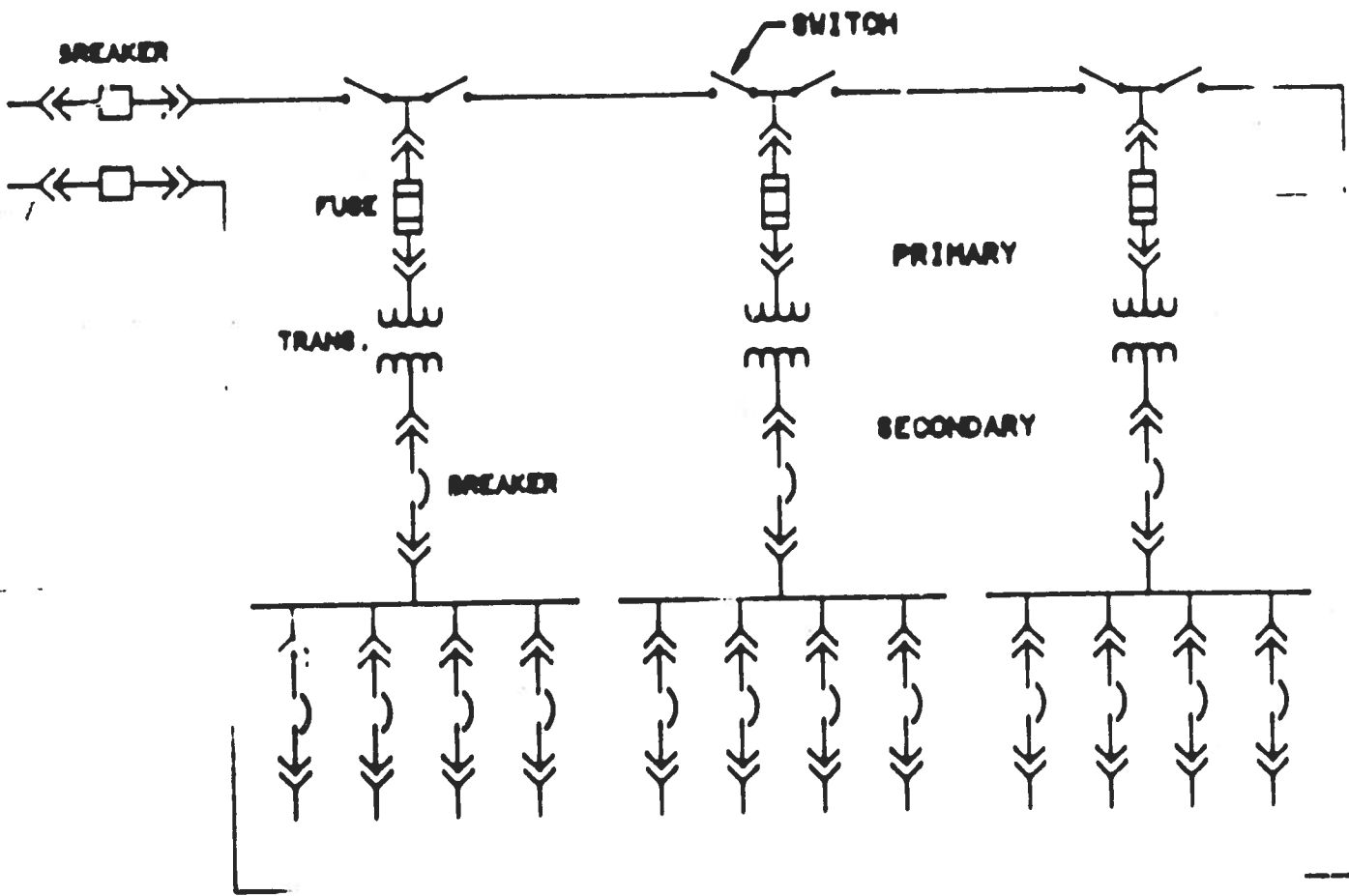


FIG. 4
PRIMARY LOOP SYSTEM

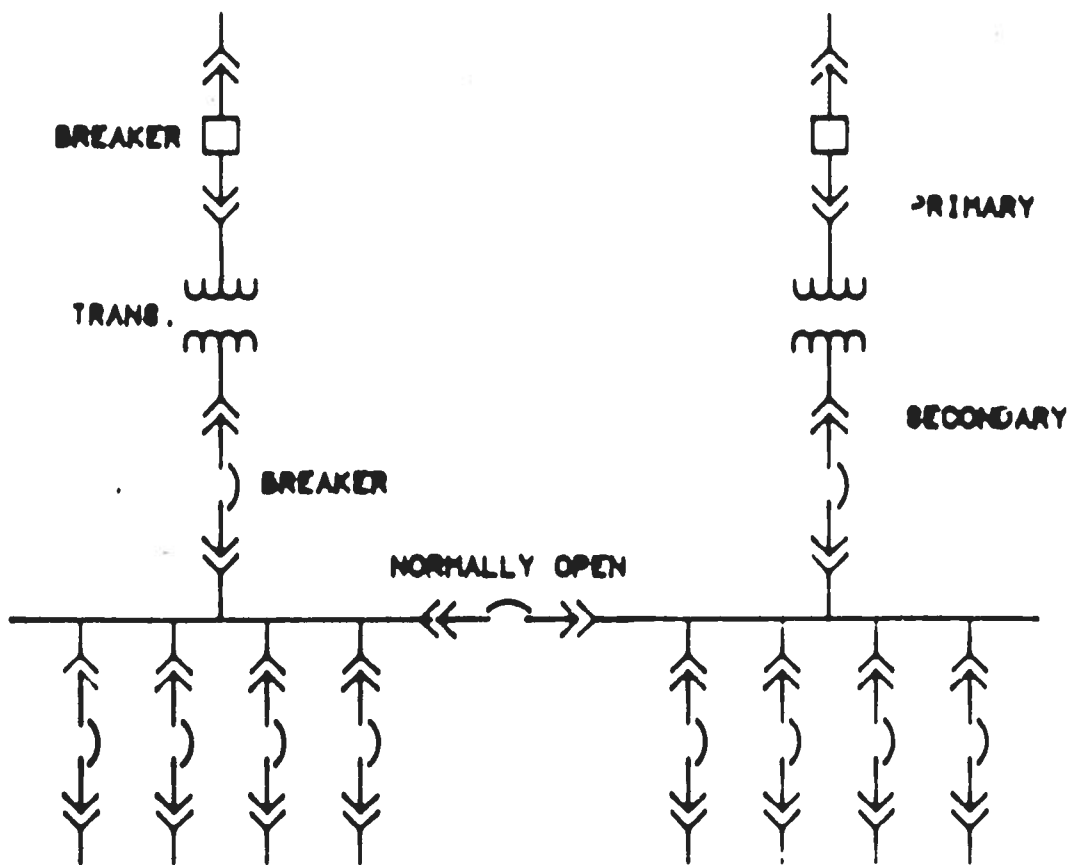


FIG. 5
SECONDARY SELECTIVE SYSTEM

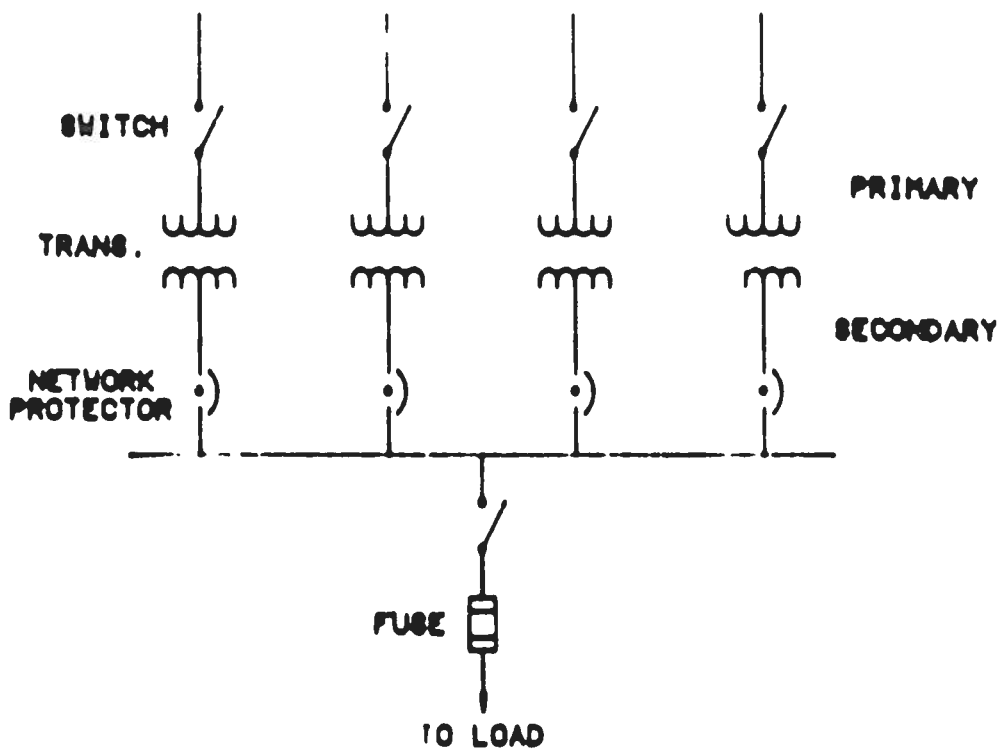


FIG. 8
SECONDARY SPOT NETWORK