REPLACING OPERATED FUSES

1. GENERAL

1.01 This section describes:

(a) General precautions to be observed in replacing fuses.

(b) Changes in the method of replacing fuses having a condenser load.

(c) Special procedures for replacement of operated cartridge fuses during temporary development of abnormal loads.

1.02 It is reissued to show procedures for replacement of fuses having one or more decentralized filters.

1.03 Special procedures may be required for replacing battery distributing fuses serving line finders and possibly for replacing fuses serving some other types of equipment, in which a temporary abnormal load may develop immediately after insertion of a new fuse. When such a fuse is operated by a short circuit to ground occurring during a busy hour, calls may "pile up" on the equipment while it is out of service. It is possible that after the fault has been cleared and the circuit re-energized, the initial current drain will exceed the capacity of a replacement fuse. In some such cases it may be feasible to open temporarily the leads to portions of the equipment served and to reconnect them one by one, thus avoiding overloading the distributing fuse. Usually, however, such a procedure would delay complete restoration of service, and the method described in Part 3 should be used.

1.04 Spare fuses of all required capacities, fuse pullers, and screwdrivers for use in making fuse replacements, should be readily available. Double fuses as described in 3.02:

(a) Should be available for temporary replacement of battery distributing fuses serving line finders in all large step-by-step offices.

(b) May be provided for other circuits and other types of offices when circumstances warrant.

2. PRECAUTIONS

2.01 Locate and clear the fault which caused the fuse operation before inserting the new fuse.

2.02 Be sure that the capacity of the new fuse is correct. Check against markings on the panel or the fuse block.

2.03 Use a fuse puller when replacing cartridge fuses. This protects you against possibility of injury should a new fuse operate while being installed.

2.04 In replacing alarm type fuses, see that the alarm tongue is not bent or otherwise defective, that the bead holder is in correct position, and that the screws are firmly seated.

2.05 When the circuit in which the fuse is used includes a switch or other device for opening the circuit, see that circuit is opened before replacing the fuse. Reenergize the circuit after the new fuse has been inserted.

2.06 When the circuit includes two fuses in tandem and is provided with a bridging switch for short circuiting either one of the two fuses, an operated fuse is removed from service and a good fuse is connected by operating the bridging switch to short-circuit the operated fuse. After such an operation a new fuse should immediately be installed in place of the operated fuse.

2.07 In a circuit containing a cartridge fuse in parallel with an alarm-type fuse, the alarm-type fuse will normally operate only after operation of the cartridge fuse. Be sure to replace the alarm-type fuse after the cartridge fuse has been replaced.

NOTE: Operation of the alarm-type fuse without operating the cartridge fuse, may be caused by fuses of incorrect capacity or by high contact resistance in the portion of the circuit associated with the cartridge fuse. If such a condition is encountered and cannot be corrected, it should be reported to the General Plant Supervisor for investigation.

3. SPECIAL PROCEDURE FOR REPLACEMENT OF FUSES WHEN TEMPORARY ABNORMAL LOADS ARE ENCOUNTERED

Fuses Having No Condenser Load

3.01 This procedure applies when a cartridge fuse has been operated by an accidental short circuit or ground under circumstances (such as those described in 1.03) which permit a temporary abnormal load immediately upon insertion of the new fuse. The procedure does not apply when overloads of any appreciable duration are due to cable failures or other trouble conditions. The double fuses specified for use in connection with this procedure are never to be used as a means of carrying such overloads.

3.02 This procedure requires the use of a double fuse consisting of two fuses, side by side, soldered together at each end. In soldering ensure:

(a) That the fuses are not rendered defective by excessive heating.

(b) That surplus solder is not left where it might prevent insertion of the fuse into the fuse mounting.

3.03 Each of the two fuses used in making the double fuse should be of the same capacity as the fuse to be replaced. In addition to the double fuse, two separate fuses of the same capacity as the fuse to be replaced will be needed.

3.04 When a fuse and the fault has been cleared, insert the double fuse into the circuit in place of the blown fuse. Then:

(a) When the equipment served by the fuse indicates that the initial abnormal load has subsided (which should be within ½ to 2 minutes after closure of the circuit), place one of the separate spare fuses in contact with the outside of the fuse clips, holding it firmly with the fuse pullers.

(b) While maintaining the continuity of the circuit in this way, remove the double fuse and insert the second separate fuse in its place.

(c) Finally, withdraw the first separate fuse from contact with the fuse clips.

NOTE: If a bridging switch is provided, there will be no need to hold a fuse against the outside of the fuse clips, Substitution of the permanent fuse can, in that case, be accomplished through the use of the switch.

Fuses Having a Condenser Load

3.05 The charging current of a condenser, when added to the load, may be sufficient to operate the associated fuse unless precautions are taken when the fuse is installed. Operation is more likely to occur with a large condenser and a small fuse.

3.06 A lamp or a resistor held for a few minutes in series with the condenser and source of power will allow the condenser to charge and avoid the chance of the fuse operating. A permanent fuse should be installed before removal of the lamp or resistor while the condenser is still charged.

3.07 Some condensers are provided with a permanent charging fuse and resistor, as well as the customary circuit fuse. In this case replacement of fuses must be the proper sequence, i.e., charging fuse put in circuit first, then the regular circuit fuse placed second.

3.08 Fuses serving important services having high capacity condensers in the supply circuits, such as program, multichannel carrier, etc., may be designated at the discretion of the supervisor by stenciling a yellow "C" above the fuse.

Fuses Having One or More Decentralized Filters

3.09 When charging current is applied to these circuits with high rated capacitors, such as SD-95571-01 where capacitance can be as high as 14,000 MF, the electrical effect is a dead short. Reoperation of new fuses will continue unless precautions are taken when the fuse is installed:

(a) Clear the trouble which caused the fuse to operate.

(b) Remove the charge — discharge fuse(s) and alarm fuse(s) in the associated filter circuit.

(c) Replace the operated battery supply fuse.

(d) Connect a portable 110-volt lamp equipped with a rubber or neoprene insulated alligator clips or a resistor, across the terminals of the charge-discharge fuse holder. This will permit the capacitor to charge through the resistance of the lamp or resistor.

(e) Replace the cartridge charge-discharge fuse, keeping the charging lamp or resistor in place.

(f) Disconnect the capacitor charging lamp or resistor.

(g) Replace the alarm fuse.

(h) If there is more than one filter capacitor, repeat steps (c) through (f) for the additional capacitors.