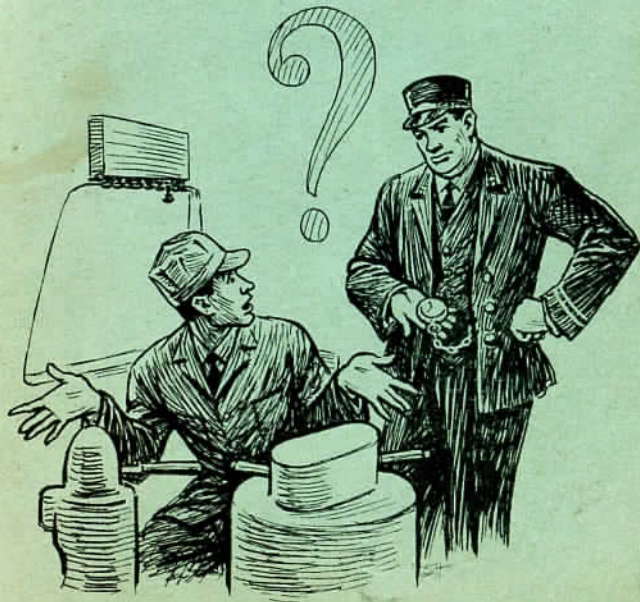




**ON - THE - ROAD
TROUBLE - SHOOTING**



INTRODUCTION

This booklet is produced to fill the need for a reminder or check list as an aid to qualified operating personnel. Its purpose is to call the Operator's attention to the troubles which are most frequently encountered on-the-road. Explanations have been deleted and the less frequent causes of trouble omitted in order to focus attention on the quickly remedied troubles thereby eliminating many delays.

This booklet is not a manual and makes no attempt to explain general operations and functions of equipment on the locomotive. For such information, please refer to your EMD Operating Manual.

This particular booklet has been written principally around the Model F3. However, it will be found equally desirable as a guide on other model locomotives if the reader will consider the differences in the arrangement of equipment as compared to the illustrations used herein.

W. E. Day

1. WHAT IS NECESSARY TO MAKE THE LOCOMOTIVE OPERATE?

The following 13 items are essential: Items (a) to (d) in the cab from which you are operating and items (e) to (m) in all units of the locomotive.

- a. "PCS OPEN" light must NOT be burning.
(If light is burning see Question 2, Page 5)

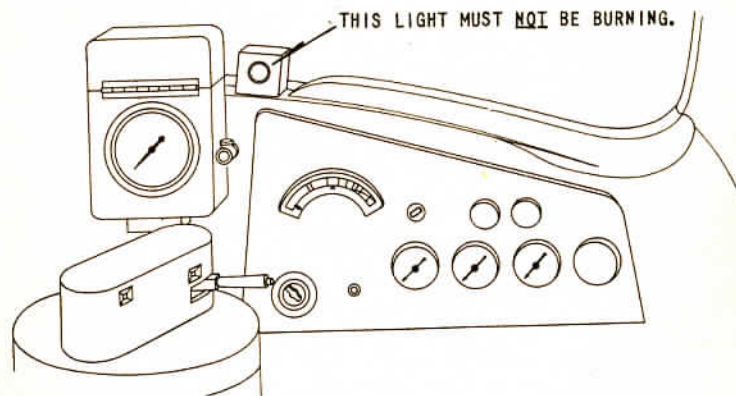


Fig. 1

- b. The control, fuel pump, and generator field buttons must be pushed IN.

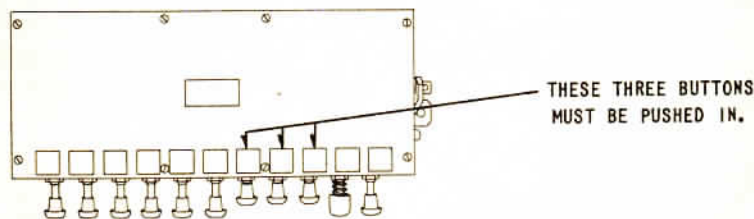


Fig. 2

- c. The engineer's reverse lever must be in the forward or reverse position and transition lever in No. 1 position.
- d. All the brakes must be released.
- e. All switches in each distribution panel must be closed (Fig. 3).

THE FUSES MARKED "X" SHOULD BE TESTED TO BE SURE THEY ARE GOOD.

IF THIS AMMETER SHOWS A DISCHARGE WHEN ENGINE IS RUNNING, CHECK AUX. GEN. CHARGING FUSE (FIG. 8, PAGE 5).

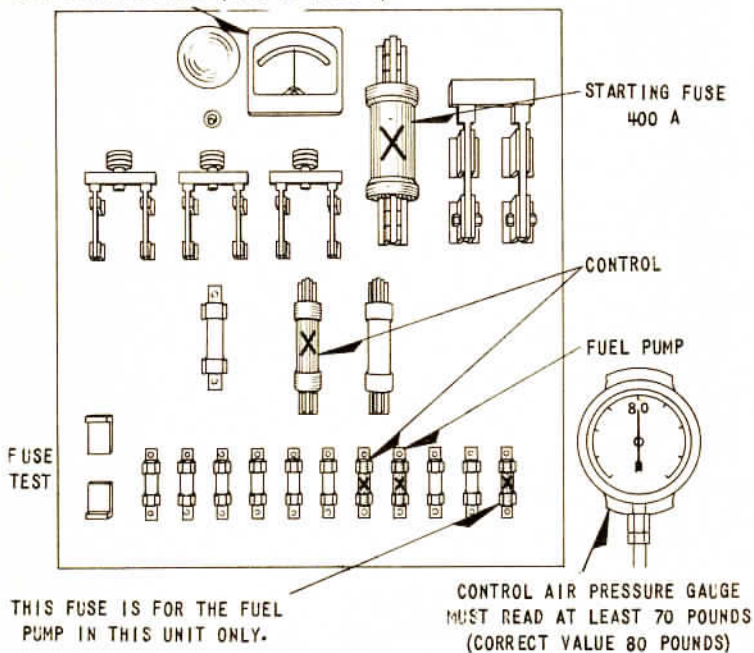


Fig. 3

- f. There must be approximately 80 pounds of control air pressure on the gauge next to each distribution panel. (If no pressure or incorrect pressure, see Question 10, Page 10.)

- g. Fuel pumps in all units must be running and fuel flowing through sight glasses.
(If not refer to Questions 5 & 6 on Pages 6 & 7)

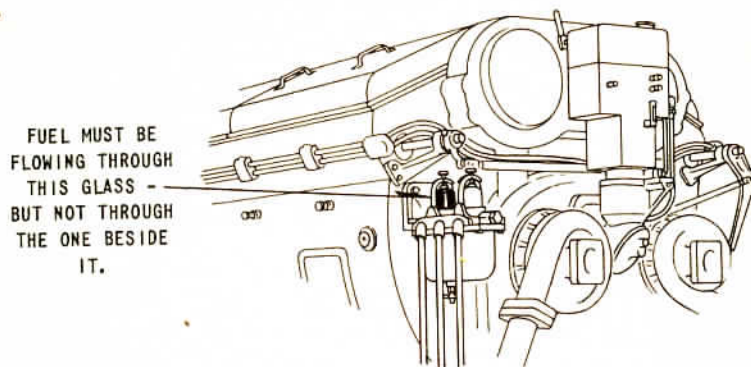


Fig. 4

- h. The engines must be running.
(If stopped refer to Question 7, Page 8)
- i. The isolation switches must be in "RUN" position.

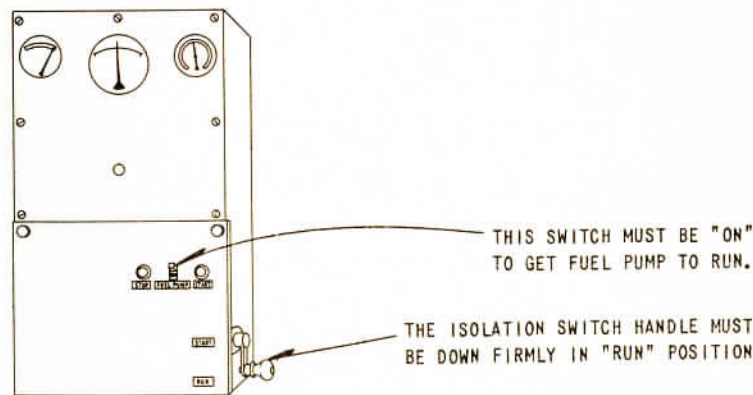


Fig. 5

- j. The ground protective relays must be set.
(If tripped to red dot refer to Question 9, Page 10).

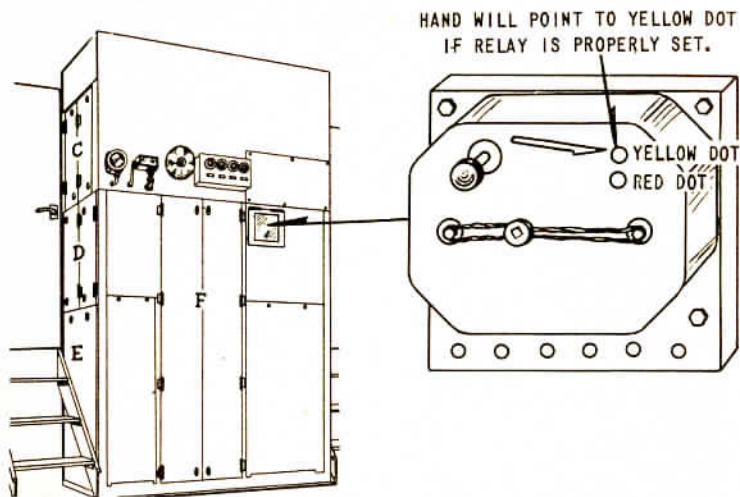


Fig. 6

- k. The starting contactors must NOT be stuck closed.

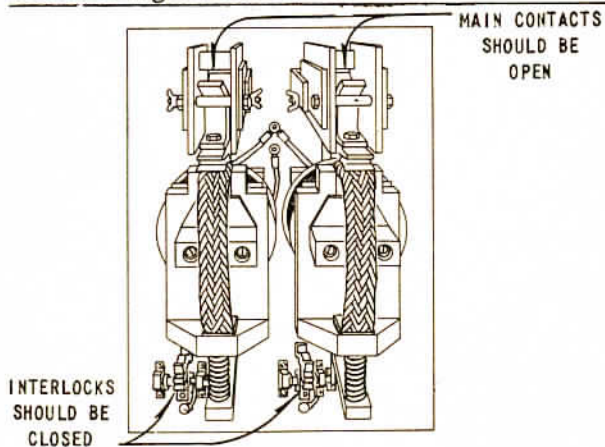


Fig. 7

- l. Battery field fuses in all units must be good.

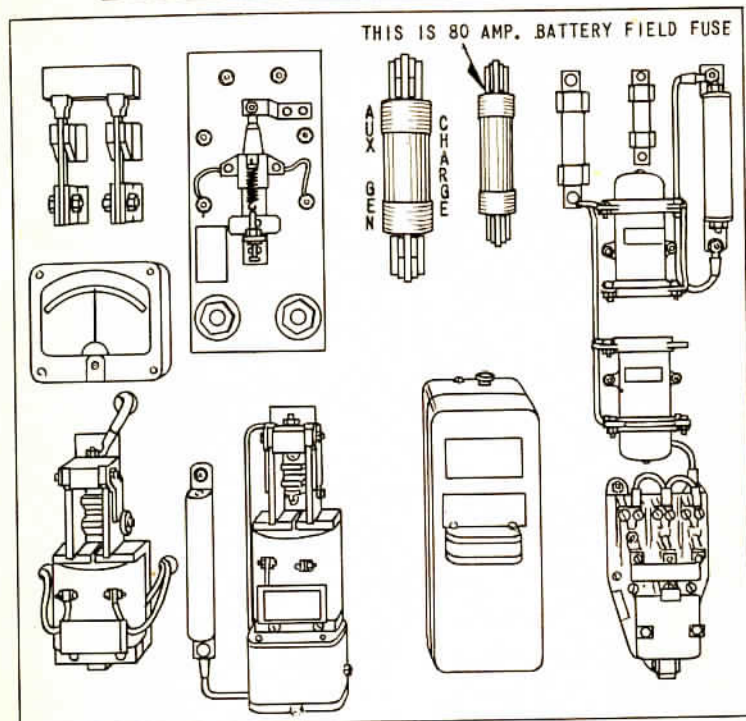


Fig. 8

- m. Be sure that all hand brakes are fully released.

2. HOW CAN I MAKE THE "PCS OPEN" LIGHT GO OUT?

The "PCS Open" light is caused to burn only by an emergency or a penalty application of the brakes. By a penalty application, we mean one caused by removing your foot from the deadman, overspeeding the locomotive, or application caused by train control devices.

To get the light to go out a good procedure is to be sure the throttle is in "idle" position and then take whatever steps are necessary to fully release the automatic brake.

If the brakes are applied in "Service" the brake valve may be placed in lap and left there until the light goes out. If there has been an emergency application, the brake valve must be lapped and then moved to running position before the light will go out.

3. IF I DO NOT GET THE "PCS OPEN" LIGHT TO GO OUT WHAT WILL HAPPEN?

Engines will idle for about five minutes, but after that the engines may stop for lack of fuel since when the "PCS Open" light is burning all the fuel pumps in the locomotive are stopped.

4. IF AN ENGINE STOPS WHEN THE "PCS OPEN" LIGHT IS BURNING WILL THE BLUE LIGHT COME ON AND THE ALARM BELLS RING?

No.

5. IF THE FUEL PUMP IS NOT RUNNING WHAT CAN BE DONE?

Check other pumps in the locomotive to see if they are running. If all the fuel pumps are stopped, check the items shown on Figures 1, 2, and 3 in this booklet.

If only the fuel pump in one unit is stopped, be sure the switch on the engine control panel (Fig. 5) is turned on and the control and fuel pump motor fuses in that unit (see Fig. 3) are O.K.

6. IF THE FUEL PUMP IS RUNNING BUT FUEL DOES NOT SHOW IN THE FUEL RETURN SIGHT GLASS (Fig. 4) WHAT CAN BE DONE?

If fuel is flowing in the other glass (45 pound) next to the return sight glass, the fuel filters are clogged and nothing can be done on the road.

If no fuel is flowing in either glass, check to see that the emergency fuel cutoff valve under the locomotive fuel tank has not been tripped (See Fig. 9). If this valve is properly set the suction strainers may be clogged and if tools are available, the Wastex may be removed and the filter element replaced without any Wastex.

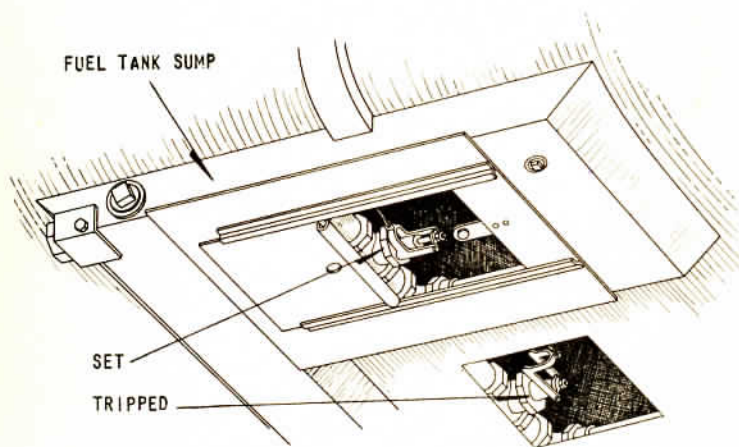


Fig. 9

7. IF I FIND AN ENGINE STOPPED WHAT SHALL I DO?

Pull the isolation switch handle up into "START" position (Fig. 5). Make certain the switches on the distribution panel in this unit are closed and the fuses good (See Fig. 3).

Then be sure the fuel pump switch is "ON" (Fig. 5), and check the fuel return sight glass for a good flow of fuel. (Fig. 4).

Look at the overspeed trip lever and move it counter-clockwise to be sure it is "set" (Fig. 10).

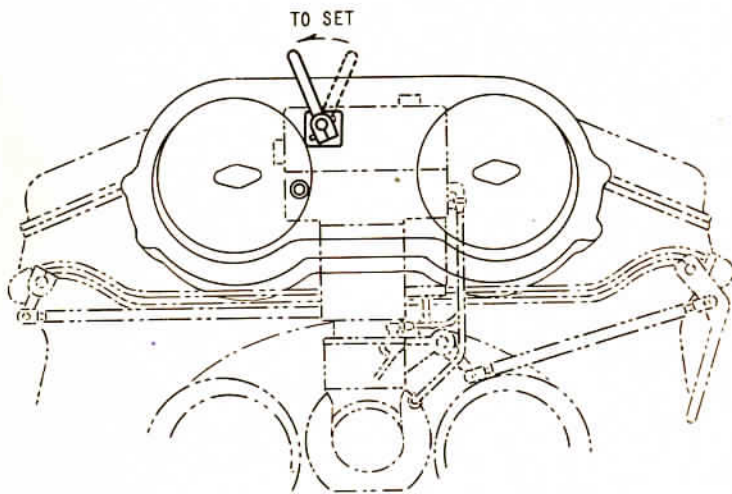


Fig. 10

Be sure the low oil pressure trip button on the governor is pushed in so the red part of the shaft is not showing (Fig. 11).

Hold the layshaft part way open and start the engine by pressing on the "START" button. Check the ground protective relay (Fig. 6) and the starting contactors (Fig. 7) and then put the isolation switch down in "Run" position.

ENGINE GOVERNOR

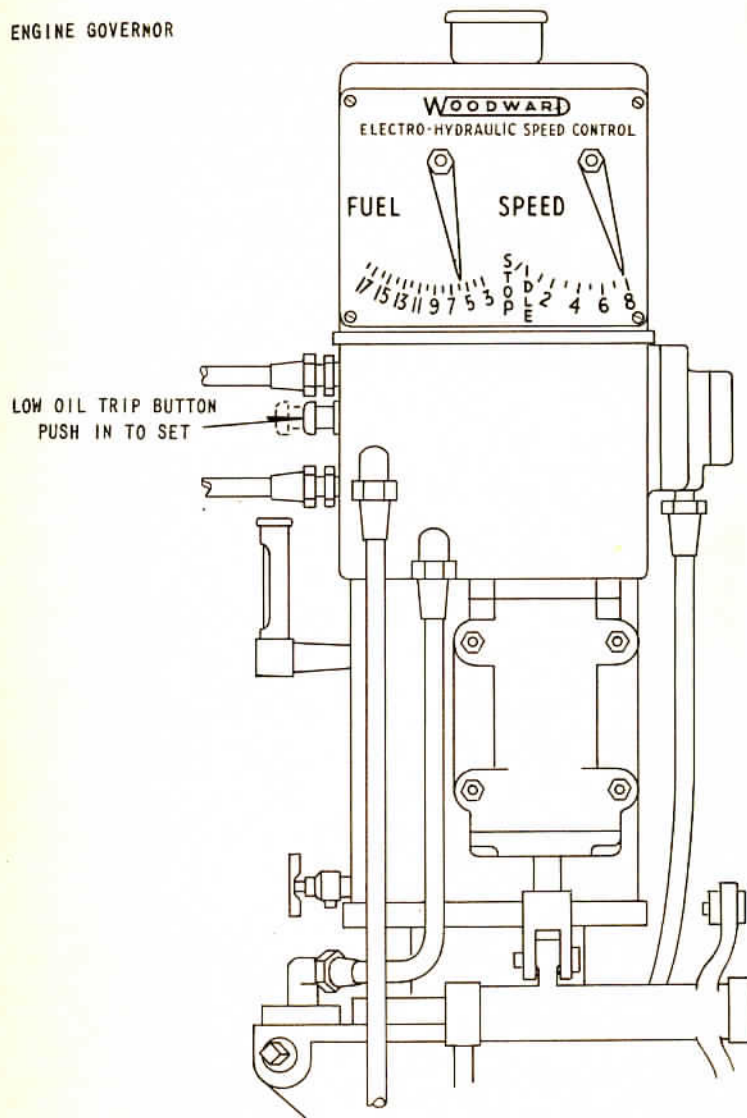


Fig. 11

8. HOW CAN I TELL IF AN ENGINE IS PUTTING OUT POWER?

When the engineer has the throttle in Run 8 pulling a train, the plate on the governor should appear as in Fig. 11. If the right hand scale does not read 8 but reads idle, the isolation switch may not be in "RUN" or the ground protective relay may be tripped. If the right hand scale shows 8 but the number on the left hand scale reads 8 to 10, the engine is not loaded and there is probably electrical trouble. Check the battery field fuse; it may be blown (See Fig. 8) or the control air (Fig. 3) may be low.

If this does not correct the condition have the engineer reduce the throttle to "idle" momentarily and then return it to Run 8 and check the scales on the governor plate again.

9. HOW IS GROUND PROTECTIVE RELAY SET?

Isolate the engine, press on ground protective relay set button (Fig. 6), then place isolation switch firmly in "RUN" position. If ground protective relay continues to trip, isolate engine and shut down.

10. HOW CAN I GET CONTROL AIR PRESSURE ON GAUGE?

Control air pressure may be shut off at piping to control air regulator, the regulator may be set too low (turn knob on top clockwise to raise pressure), or air may be shut off at valve in control cabinet. Control air comes from main reservoir so main reservoir pressure must be up. Pressure on gauge should be at least 70 pounds. Control air pressure as high as main reservoir is acceptable in an emergency. The correct setting is 80 pounds.

11. HOW DO I START THE ENGINES?

Enter the cab from which you are going to operate.

- a. Close all switches in distribution panels (See Fig. 3, Page 2).
- b. Push in "Fuel Pump" and "Control" buttons on engineer's push-button control switch box in the cab.
- c. Place independent brake in full application position.
- d. Check to see that "PC Open" light is not burning (See Fig. 1, Page 1).
- e. Be sure reverser lever is removed from control stand.
- f. Start each engine in the locomotive as indicated in Question 7, Page 8).

12. HOW SHALL I SECURE THE LOCOMOTIVE WHEN I LEAVE IT?

- a. Set independent brake or hand brake.
- b. Place transition lever in "Off" position.
- c. Place reverse lever in neutral and remove lever from controller.
- d. Stop each engine as follows:
 - (1) Place isolation switch in "Start" position.
 - (2) Push engine "Stop" button in and hold it in until engine stops.
 - (3) Place fuel pump switch in "Off" position.
 - (4) Protect engine cooling system against freezing in cold weather.
- e. Open all switches in distribution panel of each unit.
- f. Pull out all buttons on engineer's push-button control switch box.

NOTES

TROUBLE SHOOTING CHART

(✓ Indicates Possible Cause of Trouble)

CAUSES OF TROUBLE	SYMPTOMS			
	Engine Stops Suddenly	Engine Goes to Idle	Generator	Inloads
Overspeed Trip - - - - -	✓			
PC Switch Tripped - - - - -	✓(All engines stop eventually,	✓ (All Engines)		✓ (Momentarily)
Wheel Slip - - - - -	- - - - -	- - - - -	- - - - -	✓
Ground Protective Relay - - - - -	✓(Run 5 or 6 Only)	✓	- - - - -	
Emergency Fuel Cut-Off - - - - -	✓(Engine stops eventually)		- - - - -	
Low Oil Pressure or				
High Oil Suction - - - - -	✓			
Isolation Switch - - - - -	- - - - -	✓	- - - - -	✓
Fuses in Control Circuit - - - - -	✓(All engines stop eventually)	✓	- - - - -	✓
No AC Voltage - - - - -	✓(Run 5 or 6 Only)	✓ (Blue Light)	- - - - -	✓
Interlocks in Control Circuit - - - - -	- - - - -	- - - - -	- - - - -	✓
Loss of Control Air - - - - -	- - - - -	- - - - -	- - - - -	✓
Throttle - Emergency Stop - - - - -	✓(All Engines)		- - - - -	
Jumper Cable - - - - -	✓	✓	- - - - -	✓

Note: Blue Light Signifies Either Alternator Failure or Engine Stopped.

Symptoms	Cause of Trouble	Remedy
Generator shuts off, bell rings	Motor overload relay trips, shutting down generator	Reset overload relay, refill coils and start steam generator. Report to maintenance
Generator runs, dome gets hot	Lack of air, dirty coils	Set water by-pass regulator back 10 to 15 lbs. Report to maintenance
Generator runs but no water returns through water flow indicator	Valve in return line from separator closed Return water strainer clogged Steam too dry	Open Clean Report to maintenance
Generator runs but trainline pressure cannot be controlled by water by-pass regulator	Steam admission valve closed Water admission valve closed Defective water by-pass regulator	Open Open Close water shutoff valve to water by-pass regulator, use manual by-pass valve to control pressure. Report to maintenance

Symptoms	Cause of Trouble	Remedy
Motor runs, no spark at electrodes	Wires from electrodes to transformer broken or grounding Terminals loose on transformer Gap between electrodes too wide	Repair Tighten Reduce gap (Should be 1/4" to 5/16")
Motor runs, fire does not light "Run"	10 amp. ignition fuse (2 on boiler panel) blown Atomizing air valve closed Motor not allowed to stop before turning switch to run	Test and replace Open Turn "fill" briefly, then to "off." After motor has stopped and servo control is all the way down, turn to "Run"
Generator shuts off, bell rings	Electrodes not properly adjusted Nozzle not properly adjusted Stack switch tripped	Adjust. Report to maintenance Adjust. Report to maintenance. Reset stack switch, re-fill coils, start steam generator, and set water by-pass regulator at slightly lower pressure. Report to maintenance.

TRUBLE SHOOTING FOR STEAM GENERATORS

Symptoms	Cause of Trouble	Remedy
Panel lights do not light; bell does not ring (Control switch "OFF" Main boiler switch "ON)	Main battery switch "OPEN" Auxiliary generator switch "OPEN"	Close
	100 amp. boiler fuse (2) blown (distribution panel)	Test and replace
	10 amp. control fuse (2) blown (boiler panel)	Test and replace
Motor does not run (control switch "FILL," bell rings)	Stack switch tripped	Re-set
	Motor overload tripped	Re-set
	Coil blowdown valve "OPEN"	Close
Motor runs, no strong flow of water from water pump test valve	Water tank empty	Fill
	Valve on suction line closed (on line to treatment tank)	Open
	Drain valve on suction line or treatment tank open	Close
	Top of treatment tank not tight	Re-set and tighten
	Treatment tank strainer clogged	Clean
	Water in storage tank too hot	Make sure steam heat valve to water tank is closed