



**BLACKHAWK  
ENGINEERING INC.**

STATE CERTIFICATE # 26881

9013 MAHAN DRIVE, SUITE 101, TALLAHASSEE FLORIDA 32309  
PHONE (850) 224-4295 + FAX (850) 386-4295 + EMAIL : SUPPORT@BLACKHAWKENGINEERS.COM

**OPERATION AND MAINTENANCE PLAN**  
**AIR CURTAIN INCINERATOR**

**BARBER YARD TRASH FACILITY**  
**Tram Court, Leon County, Florida**  
**May 2009**

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## **OPERATION AND MAINTENANCE PLAN AIR CURTAIN INCINERATOR**

### **BARBER YARD TRASH FACILITY Tram Court, Leon County, Florida May 2009**

#### **General**

Site Location: Tram Court, off Tram Road in Section 19, Township 1-South, Range 1-East, Leon County, Florida.

Facility Number: 397-08-YT (Yard Trash Processing Facility)  
0730111 (DEP Air Program Facility ID)

Site Plan: See Appendix D

Equipment: McPherson Systems Inc. Air Curtain Destructor, Model No. M40F. A copy of the manufacturer's operation and maintenance instructions is attached (Appendix E).

#### **Emergency Contacts**

**IN CASE OF EMERGENCY, DIAL 911.**

Non-Emergency Numbers are provided in Appendix A.

#### **Record Keeping**

Owner shall maintain records of the following:

- + Materials received, including date, type, quantity and hauler
- + Information for the DEP Yard Trash Facility annual report, including quantities (by ton) of materials received, processed, and exported
- + Daily log of beginning and ending charging times (charging/loading of the burn pit)
- + Compliance tests (visible emissions)
- + Regulatory inspections and enforcement actions
- + All applicable permits including DEP and local (Leon County) permits
- + Soils and compaction tests for burn pit construction (see Appendix B)

### **Materials Accepted**

This facility accepts yard trash only. Yard trash is defined in F.A.C. 62-701 as “vegetative matter resulting from landscaping maintenance or land clearing operations and includes materials such as tree and shrub trimmings, grass clippings, palm fronds, trees and tree stumps.”

Yard trash will be placed in the areas designated on the site plan prior to disposal in the burn pit. Incoming loads shall be inspected, and any loads that contain unacceptable materials shall be rejected. If any unacceptable wastes are inadvertently received on site, the unauthorized materials shall be handled as noted below.

Acceptable materials include: yard trash consisting of clean, untreated wood waste, trees and tree branches, logs, large brush, clean stumps (free of excess soil), and vegetative material such as leaves and grass clippings.

Unacceptable materials include: treated or painted wood, sawdust, paper, tires, plastics, liquid wastes, and miscellaneous trash and garbage.

### **Site Access and Control Features**

Access to the site is controlled via a gated entrance off Tram Road. All trucks shall enter through this gate. The gate shall be kept locked when the facility is not operating. Fences shall be inspected periodically and maintained as needed.

### **Pit Location and Construction**

The pit shall be located no less than 300' from any occupied structure, and at least 50' from any trees, brush, or combustible material. Refer to the attached site plan.

The pit shall be constructed above grade in accordance with the approved specifications (Appendix B). A minimum of 10' acceptable fill material is required between the bottom of the burn pit and existing grade. Soils and compaction tests showing compliance with the specifications shall be maintained with the facility records.

The dimensions of the pit shall be as follows (see manufacturer's set-up diagram): 40' long (the length of the ACI manifold), 9' wide, and 10' to 15' depth. The pit must be constructed with vertical sides.

If spalling or caving in of the pit walls occurs during operation, the walls must be reconstructed in accordance with the burn pit specifications, or a new pit must be constructed. When use of a pit is terminated, the fill material shall be removed, and the area returned to natural grade.



### **Hours of Operation**

Operation of the Air Curtain Incinerator (ACI) shall not begin before sunrise. Charging of the unit shall be terminated no later than one hour after sunset, or as specified in the DEP permit. After charging ceases, air flow shall be maintained until all material within the ACI pit has been reduced to coals, and flames are no longer visible.

Owner shall contact the Division of Forestry on a daily basis prior to burning, or consult their website, to determine if conditions are favorable for burning that day.

The total hours of burning shall not exceed 832 hours per year, as specified in the DEP permit.

### **Ignition Procedure**

Load the pit half-full with acceptable wood material. Douse the wood with an acceptable starter liquid, putting the majority of the liquid at the front center side of the pit. Ignite the wood at the same point. Allow sufficient time for the fire to begin burning before introducing any air from the ACI. As the fire grows in intensity, gradually bring the blower up to optimum speed.

Only kerosene, diesel fuel, drip-torch fuel (as used to ignite prescribed fires), untreated wood, virgin oil, natural gas or liquefied petroleum gas may be used to start the fire. The use of waste oil, chemicals, gasoline or tires is prohibited.

### **Loading Procedure**

Once the fire reaches full intensity, charging (loading of the pit) may begin. A "stop guide" or restraint should be provided on the loading side of the pit to prevent the loader from getting too close to the pit while charging.

Suitable material shall be added to the pit at the rear of the pit under the ACI manifold. The pit shall not be overloaded; that is, the added material shall not protrude above the top of the air curtain. The charging rate shall not exceed the rate specified in the DEP permit.

### **Operation and Safety Requirements**

- The Air Curtain Incinerator (ACI) shall be attended at all times while it is in use.
- A first aid kit and fire extinguisher shall be kept at the site at all times.
- Any standing water must be removed from the burn pit before beginning operation.



- Ash shall be removed from the pit when it reaches 1/3 of the pit depth, or when it reaches a depth where the ash begins to impede combustion, whichever occurs first. Ash will be reused on site by mixing it with clean fill and recycling it as a soil amendment.

## **Maintenance Schedule**

### **Engine Routine Maintenance:**

#### **Machine Start-up:**

1. Check engine oil and coolant fluid levels, top off as necessary.
2. Clean and inspect air filter, and replace as needed.
3. Check engine for leaks.
4. Examine all belts for wear and tension.

#### **Scheduled Maintenance:**

1. Change engine oil and replace oil filter and fuel filter after 250 hours of operation. Keep spare filters available at all times.
2. Clean debris off radiator.
3. Check alternator belt and adjust as needed.
4. Check cooling system belt for wear and tear.

### **ACI Routine Maintenance:**

#### **Machine Start-up:**

1. Check condition of drive belts.
2. Check PTO driveshaft and fan bearings for grease, re-grease per maintenance schedule.
3. Check for any loose components and any obstructions at the fan inlet.
4. Tap dirt out of air intake housing and check for excessive dirt.

#### **Scheduled Maintenance:**

1. Grease the machine (PTO and fan bearings) daily, or for every eight (8) hours of operation.
2. Inspect the fan periodically for cracks and abnormal wear. This can be accomplished using a flashlight.
3. Inspect air fan belts for wear and tear. Tensions should be adjusted every 250 hours.

## **Trouble-shooting Procedures**

### **Engine Problems:**

Trouble-shooting procedures for the Cummins 6BT 5.9-L diesel engine are found in Appendix C. Refer to the Owner's Manual for complete instructions.



### **Too Much Air Flow:**

It is sometimes thought that more air flow will actually increase the burn rate. This is **INCORRECT**. Modifying the air flow will actually have the opposite effect and reduce the machine's through-put. Additionally it will reduce the machine's ability to meet air quality minimum standards. There is a maximum rate at which wood can burn. Trying to exceed that rate by adding more air to an air curtain burner causes two major problems:

1. It will cool the fire reducing combustion efficiency creating more smoke (carbon dioxide and nitrogen enriched). This will begin a circular effect of further reducing the oxygen and further reducing combustion efficiency. The result is your through-put drops and smoke increases.
2. Increasing the air flow beyond design standards will over pressurize the pit causing larger sized particles to be ejected from the pit. Besides violating the EPA limits for PM (particulate matter) the larger hotter embers ejected will pose a much greater fire hazard.

### **Air Flow Stops:**

1. Cease loading operations immediately.
2. Check engine/air blower to determine the problem. If engine is still running, check PTO to make sure that it is properly engaged.

### **Fire Will Not Start:**

- + Material in the pit has too much air space. To correct this, load heavy waste material, such as logs to pack down the material in the pit.
- + Material in pit is wet or green. Use more accelerant for initial lighting (do not add accelerant after the initial light off, as it may ignite unexpectedly on hot coals). Once lit add material slowly, until you build good heat in the pit.
- + Material in the pit has too much dirt mixed in. Using the loader bucket or rake, drive into the pit, if possible, then lift and drop the material to shake the dirt loose. If this does not work, the pit will have to be cleaned out and repacked.

### **Fire Burning at One End:**

Load finer more combustible materials between the area burning and the area that is not. This will cause the fire to move in that direction. Only load light materials until the fire is burning throughout the pile. Let the fire burn down to ensure the bottom materials are burning; otherwise, they will become trapped under additional loads and will burn very slow.



### **Fire Not Getting Hot:**

If your fire is not getting hot enough, you probably do not have enough material packed on top of the pit. The pit must be packed tight or you will lose your heat into the air.

### **Fire Smoking Too Much:**

- + The most common reason for a smoking fire is too much dirt going into the pit. You must make sure the wood waste material is clean.
- + If you have overloaded the pit you will begin to smother the fire and it will cool down and smoke. Only load fine highly combustible materials in small quantities to bring the temperature back up. Once the fire is burning good, stop loading and let the fire burn down some. It is important that ALL the materials in the pit will be burning. If you load too fast you will smother the fire and starve it for oxygen. This will cause smoke and it will decrease your through-put.
- + A pit that is too wide will smoke, no matter what you do to improve it. The air flow cannot circulate properly over and into a pit that is too wide. You should never attempt to light a fire in a pit that is not built properly.

### **Emergency Procedures:**

Stop loading the pit, stop the air flow by either disengaging the PTO or by shutting down the engine. Dump dirt, sand or water into the fire pit to extinguish the fire.

### **Emissions Testing**

F.A.C. 62-296.401(7) sets forth the following Visible Emissions (VE) standards for Air Curtain Incinerators:

- + Start-up: No more than thirty-five (35) percent opacity, six-minute average, not to exceed thirty (30) minutes of operation.
- + Regular operation: No more than ten (10) percent opacity, six-minute average.

In accordance with F.A.C. 62-296.410(7)(c), a visible emissions test shall be performed prior to submitting the application for an initial air operation permit, and annually thereafter. The test shall be conducted for thirty minutes using EPA Method 9 and as specified in DEP Rule 62-297.310. The DEP shall be notified at least 15 days prior to the test to allow for a DEP representative to be present. Results shall be submitted to DEP within 45 days after testing.



### **Temporary Storage and Transport of Unauthorized Materials**

Unauthorized materials shall be removed from wood piles and placed in designated temporary storage areas or containers.

The following shall be put into suitable containers and immediately removed from the facility if received: treated or untreated biomedical waste, hazardous waste, or any materials containing PCBs (polychlorinated biphenyls) in a concentration of 50 ppm or greater.

Putrescible materials such as food waste, animal carcasses and organic material shall be removed from the site within 48 hours.

Non-putrescible wastes such as tires and construction and demolition debris may be stockpiled in the open in a separate area.

All unauthorized materials shall be removed from the site within ten (10) working days of receipt, and taken to the Leon County landfill or a facility authorized to receive such materials.

The Leon County landfill is located at:

Leon County Solid Waste Collection Center  
7550 Apalachee Parkway  
Tallahassee, Florida 32311  
Phone (850) 606-1800

### **Control of Dust, Litter, Odors and Vectors**

A cover of gravel or crushed rock shall be maintained on the haul roads to reduce airborne dust from truck traffic. Additional gravel shall be added as needed to maintain a dust-free driving surface.

Litter, odors and vectors will be minimized as this facility will not be used to store municipal waste. Putrescible wastes will not be stored on site. If received, they will be removed within 48 hours as specified above. The site will not be attractive to vectors as the primary materials stored will be yard trash, and heavy equipment will be operating at the site during the day.

Water shall not be allowed to stand on the site for long periods of time in order to control mosquitos. The soils on this site have been reworked during its previous use as a borrow pit and C&D pit. Typically, the site is fairly well-drained. If any standing water is observed on the site for more than 72 hours (3 days) after a storm event, the area shall be regraded so as to remove the standing water and provide for positive drainage.



### **Stormwater Runoff**

A DEP stormwater permit was not required for this site because there is no impervious area. The site is relatively flat, with an overall slope from east to west. As noted above, the soils are fairly well-drained. According to the original Leon County permit, stormwater is to be controlled via a berm along the western boundary of the site.

Period grading of the site shall be performed as needed to prevent any standing water. When use of an area is discontinued, it shall be stabilized by seeding and mulching.

### **Closure Plan**

The facility was originally permitted in 1995, with an anticipated life of 20 years. The Barbers intend to operate the facility until the year 2015, when it is anticipated that development of adjacent properties will begin. If no development orders have been approved for adjacent properties at that time, the Barbers may continue to operate the facility until such time as development permits have been issued. The site will be closed in the year 2015 or within one year of the commencement of development of the adjacent parcels, whichever occurs later.

The closure plan for the facility, as originally permitted, is as follows:

“Upon nearing the end of the active life of the facility, final cover shall be placed on sections of the facility that will not be used for temporary storage again. At the end of the useful life, the entire site will be covered. The final cover shall consist of a layer of soil not less than twenty-four (24) inches thick and graded to prevent ponding and excessive erosion. The cover shall be seeded and/or sodded with grass to facilitate cover surface and slope stability and have an elevation equal to the surrounding grade. A cross-section of the final cover appears on the enclosed Closure Detail”.

(Source: DEP Permit Application No. SO37-274280, dated July 25, 1995)

**Burn Pits:** At closure, any burn pits shall be deconstructed, the fill material removed, and the area graded to match surrounding grade. Final cover shall consist of at least six (6) inches top soil. The disturbed area shall then be seeded and mulched with centipede seed. Any yard trash or other acceptable material which has not been incinerated may be buried on site in accordance with the facility's yard trash permit.



**Appendix A**  
**Non-Emergency Contact Numbers**  
**April 2009**

**IN CASE OF EMERGENCY, DIAL 911.**

**Non-Emergency Numbers:**

**Dept. of Env. Protection: (850) 488-3704**

Northwest District Branch Office (NWDT)  
630-3 Capital Circle NE  
Tallahassee, Florida 32301  
(850) 488-3704 / SC 278-3704  
Fax (850) 922-3620 / SC Fax 22-3620

**Fire Department: (850) 891-6600**

Tallahassee Fire Department  
327 North Adams Street  
Tallahassee, FL 32301

<http://www.talgov.com/fire/index.cfm>

**Florida Highway Patrol: (850) 488-8676**

2100 Mahan Dr  
Tallahassee, FL 32308  
Captain Al Wofford, Commander  
Tallahassee Regional Communications Center: (850) 245-7700  
<http://www.flhsmv.gov/index.html>

**Florida Div. of Forestry: (850) 488-1871**

Tallahassee Forestry Center  
Florida Division of Forestry  
865 Geddie Road  
Tallahassee, FL 32304

Ken Weber, Manager  
Email: [weberk@doacs.state.fl.us](mailto:weberk@doacs.state.fl.us)

**Burning Authorizations: (850) 488-1871**

Report a Wildfire: (850) 922-5155

Fire Weather: [http://www.fl-dof.com/fire\\_weather/index.html](http://www.fl-dof.com/fire_weather/index.html)

**Leon Co. Ambulance: (850) 606-2100**

Leon County Emergency Medical Services  
2290 Miccosukee Road  
Tallahassee, FL 32308  
Phone: (850) 606-2100  
Fax: (850) 606-2101  
Chief: Tom Quillin

**Leon County Sheriff: (850) 922-3300**

Mailing Address

Leon County Sheriff's Office  
P.O. Box 727  
Tallahassee, FL 32302

Physical Address

Leon County Sheriff's Office  
2825 Municipal Way  
Tallahassee, FL 32304

Email Addresses

Sheriff Larry Campbell - [campbell@leoncountyfl.gov](mailto:campbell@leoncountyfl.gov)  
General Email - [lcsocpu@leoncountyfl.gov](mailto:lcsocpu@leoncountyfl.gov)  
Webmaster - [lcsohelp@leoncountyfl.gov](mailto:lcsohelp@leoncountyfl.gov)

**Red Cross: (850) 878-6020**

American Red Cross - Capital Area Chapter  
187 Office Plaza  
Tallahassee, Florida 32301

**Business Hours:**

Monday - Wednesday - Friday

8:30am - 4:30pm

Tuesday - Thursday

8:30am - 9:00pm



*OPERATION AND MAINTENANCE  
APPENDIX A  
MAY 2009*

Phone: (850) 878-6020  
Toll Free: (866) 943-9010  
Fax: (850) 878-3441

<http://www.tallyredcross.org/index.html>

**Tallahassee Police Dept: (850) 891-4200**

Police Department  
234 East Seventh Avenue  
Tallahassee, FL 32303

<http://www.talgov.com/tpd/>



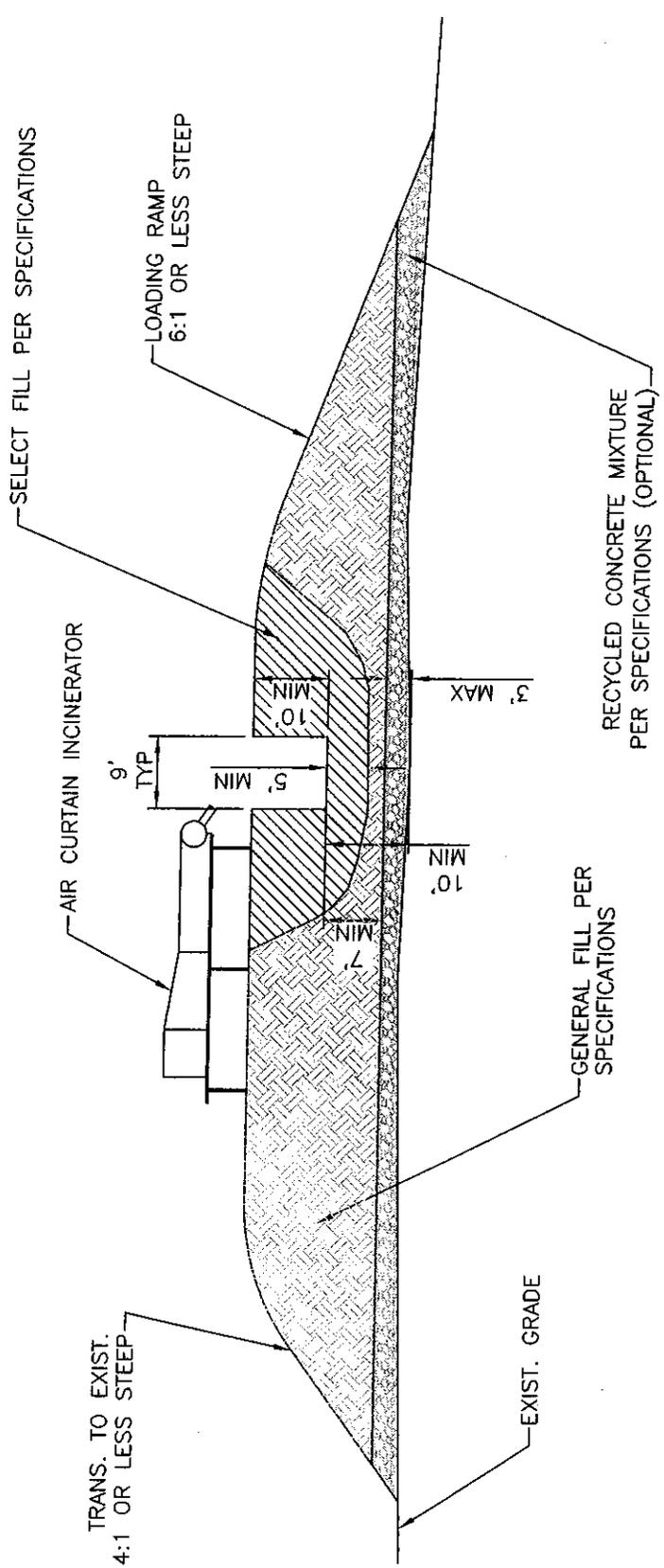
**APPENDIX B**

**BURN PIT SPECIFICATIONS**

## **APPENDIX B**

### **BURN PIT SPECIFICATIONS**

# DRAFT



BARBER YARD TRASH FACILITY

SCALE: N.T.S.

DATE:	5/20/09	
CHECKED BY:	C.B.G.	
DESIGNED BY:	C.B.G.	
REVISED BY:	DATE:	DESCRIPTION:

CARMEN BOURGEOIS GREEN, P.E.  
FLA. LICENSE #4080

BLACKHAWK ENGINEERING, INC.  
STATE CERTIFICATE # 26681

PROJECT NO.:  
DRAWING NO.:  
FIGURE NO.: 1.0

**BLACKHAWK ENGINEERING INC.**

9013 MAHAN DRIVE SUITE 101, TALLAHASSEE, FLORIDA 32309  
PHONE (850) 224-4295 + (850) 222-7645 + FAX (850) 996-4225  
EMAIL: SUPPORT@BLACKHAWKENGINEERS.COM + STATE CERTIFICATE # 26681





BARBER YARD TRASH FACILITY  
 SCALE: NTS  
 DESIGNED BY: C.B.G.  
 CHECKED BY: C.B.G.  
 DATE: 5/209  
 ABOVE-GRADE BURN PIT  
 REVISION BY: DATE: DESCRIPTION

CARMEN BOURGEOIS GREEN, P.E.  
 FLA LICENSE #48890  
 BLACKHAWK ENGINEERING, INC.  
 STATE CERTIFICATE # 28931  
 CARMEN@BLACKHAWKENGINEERING.COM

PROJECT NO. 00814-0001-0001  
 DRAWING NO. 2.0

BURN PIT SPECIFICATIONS:

1. EXISTING GRADE, UPON WHICH PIT IS TO BE CONSTRUCTED, SHALL BE FREE OF ORGANIC MATERIAL AND STICKS, ROCKS AND OTHER FOREIGN MATERIAL GREATER THAN 2" IN DIAMETER.
2. SURFACE SHALL BE SCARIFIED TO A DEPTH OF SIX INCHES SO THAT FILL MATERIAL WILL BOND WITH EXISTING SURFACE. REMOVE ANY ORGANICS OR OTHER UNACCEPTABLE MATERIALS, AND REPLACE WITH CLEAN FILL AS SPECIFIED BELOW. SIMULTANEOUSLY RECOMPACT SCARIFIED MATERIAL WITH PLACED FILL MATERIAL.
3. GENERAL FILL MATERIAL SHALL BE SOIL CLASSIFICATIONS GW, GP, GM, GC, SW, SP, SM, SC, CL AND ML, PER ASTM D-2487, FREE OF ORGANIC MATERIAL, BOULDERS, TRASH AND DEBRIS.
4. IN THE VICINITY OF THE FIRE PIT, SELECT FILL MATERIAL WITH A HIGHER PERCENTAGE OF CLAY SHALL BE USED TO PROVIDE THE VERTICAL WALLS NEEDED FOR THE BURN PIT. SELECT FILL SHALL BE USED TO A DISTANCE OF 5' IN ALL DIRECTIONS FROM THE BURN PIT WALLS, INCLUDING ALL SIDES AND THE PIT BOTTOM. SELECT FILL MATERIAL SHALL BE ASTM D-2487 CLASSIFICATION SC/SM OR CL/ML, WITH 30% OR MORE PASSING THE NO. 200 SIEVE. THE MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, BOULDERS, TRASH AND DEBRIS.
5. CRUSHED RECYCLED CONCRETE MAY BE USED AS FILL MATERIAL IN THE LOCATIONS SPECIFIED ON THE DRAWINGS. IT SHALL NOT BE USED WITHIN 7' OF THE BURN PIT WALLS OR BOTTOM. CRUSHED CONCRETE SHALL CONFORM TO THE FOLLOWING GRADATION SPECIFICATION:

SIEVE SIZE	PERCENT PASSING (DRY WEIGHT)
1-1/2"	100%
3/4"	40 - 75%
1/4"	25 - 50%
NO. 40	5 - 20%
NO. 200	10% MAX.

6. PLACE BACKFILL AND FILL MATERIALS IN LAYERS NOT MORE THAN 12-INCHES LOOSE DEPTH BEFORE COMPACTION, MOISTEN OR AERATE EACH LAYER AS NECESSARY TO PROVIDE THE OPTIMUM MOISTURE CONTENT.
7. RECYCLED CONCRETE: CRUSHED RECYCLED CONCRETE SHALL BE MOISTURE-CONDITIONED TO WITHIN 3 PERCENT OF THE OPTIMUM MOISTURE CONTENT PRIOR TO PLACEMENT. PLACE IN HORIZONTAL LIFTS LESS THAN 8 INCHES LOOSE THICKNESS.
8. COMPACT EACH LAYER TO TO AT LEAST 95 PERCENT MAXIMUM DRY DENSITY. PROVIDE DENSITY TESTS FROM AN INDEPENDENT TESTING AGENCY LABORATORY, DEMONSTRATING COMPLIANCE WITH THE THESE COMPACTION REQUIREMENTS.
9. FILL MATERIALS, WITH RESPECT TO MOISTURE, SHALL BE USED IN THE CONDITIONS UNDER WHICH THEY ARE EXCAVATED INSOFAR AS THIS IS PRACTICABLE. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. SIMILARLY, IF SOILS ARE TOO DRY, THEY SHALL BE MOISTENED TO THE OPTIMUM RANGE NEEDED TO ACHIEVE THE REQUIRED COMPACTION.
10. A MINIMUM TESTING RATE OF ONE TEST FOR EACH EACH 2500 SQUARE FEET OF BACKFILL LIFT IS REQUIRED, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. A BACKFILL LIFT SHALL NEVER BE CONSIDERED TO BE GREATER THAN ONE FOOT IN THICKNESS.

**DRAFT**

## **APPENDIX C**

# **TROUBLE-SHOOTING PROCEDURES FOR CUMMINS 6BT 5.9-L DIESEL ENGINE**

## Section T - Troubleshooting Logic

### Section Contents

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## Section T - Troubleshooting

### Procedures and Techniques

A thorough analysis of the customer's complaint is the key to successful troubleshooting. The more information known about a complaint, the faster and easier the problem can be solved.

The Troubleshooting Symptoms Charts beginning on Page T-4 are organized so that a problem can be located and corrected by doing the easiest and most logical things first. Complete all steps in the sequence shown from top to bottom.

It is not possible to include all the solutions to problems that can occur; however, these charts should stimulate a thought process that will lead to the cause and correction of the problem.

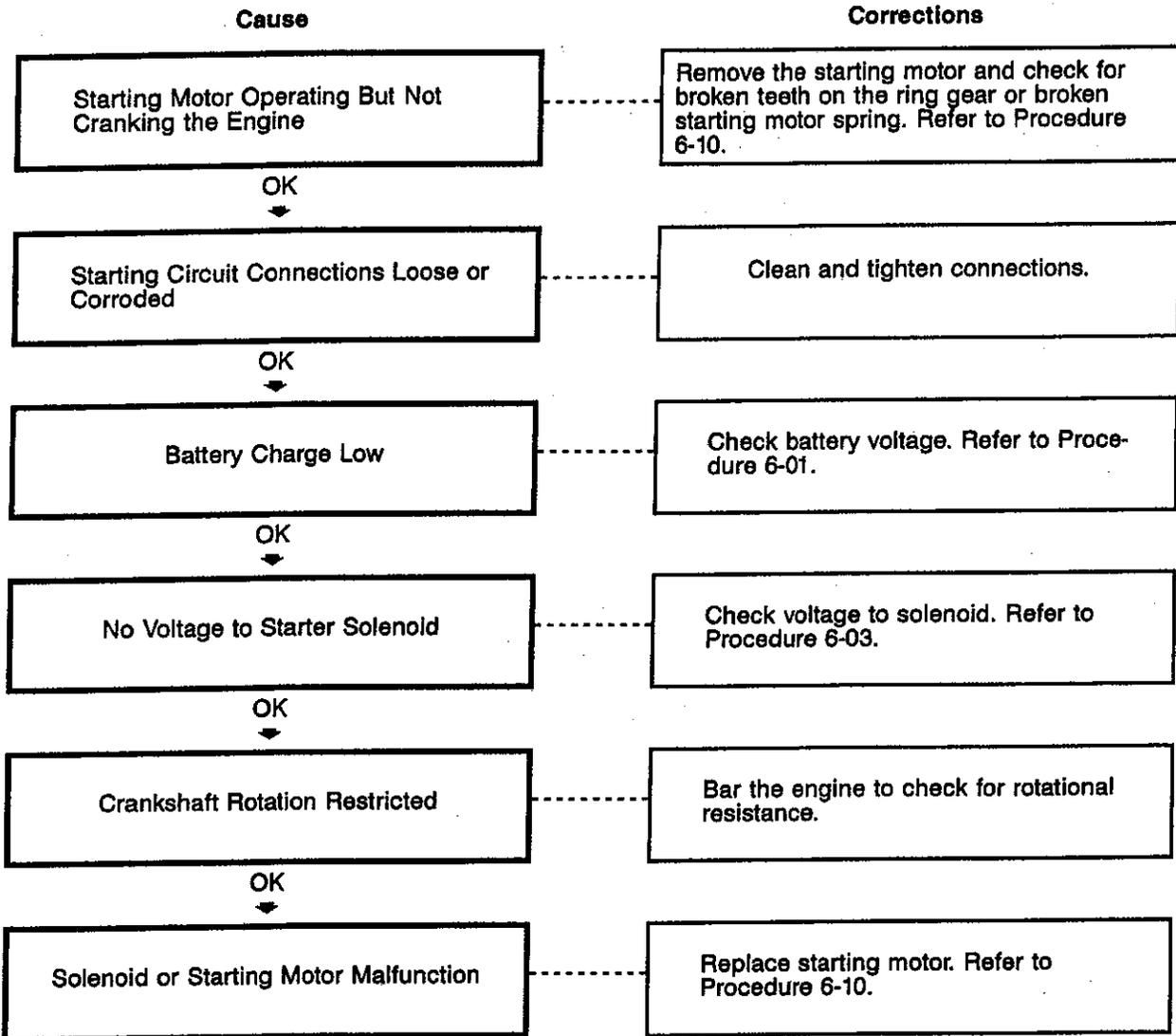
Follow these basic troubleshooting steps:

- Get all the facts concerning the complaint.
- Analyze the problem thoroughly.
- Relate the symptoms to the basic engine systems and components.
- Consider any recent maintenance or repair action that may relate to the problem.
- Double-check before beginning any disassembly.
- Solve the problem by using the logic charts and doing the easiest things first.
- Determine the cause of the problem and make a thorough repair.
- After repairs have been made, operate the engine to make sure the cause of the problem has been corrected.

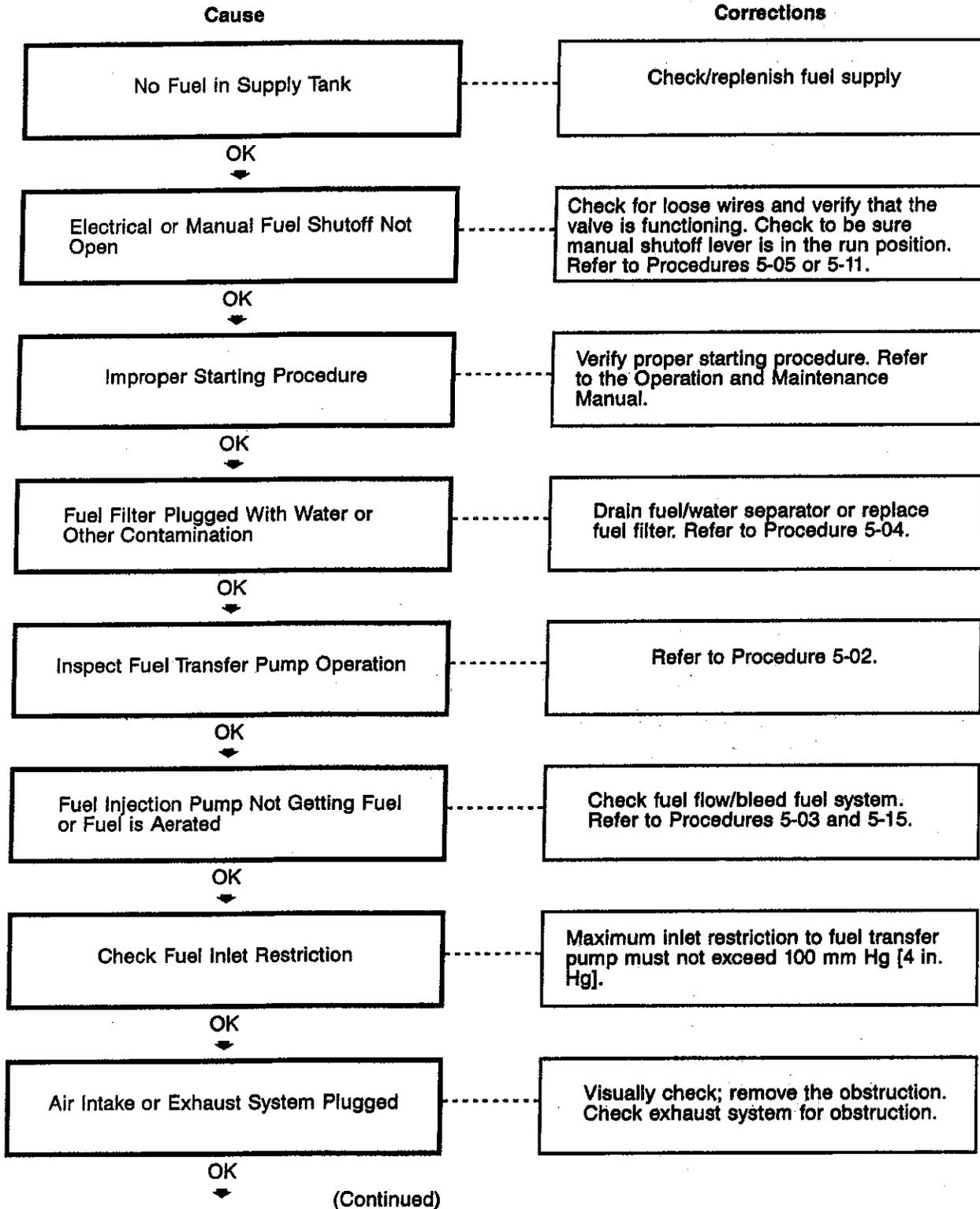
### Troubleshooting Symptoms Charts

Use the charts given on the following pages of this section to help you to diagnose and repair a problem with your engine. Read each row of blocks from top to bottom. Follow the arrows through the chart to identify the corrective action.

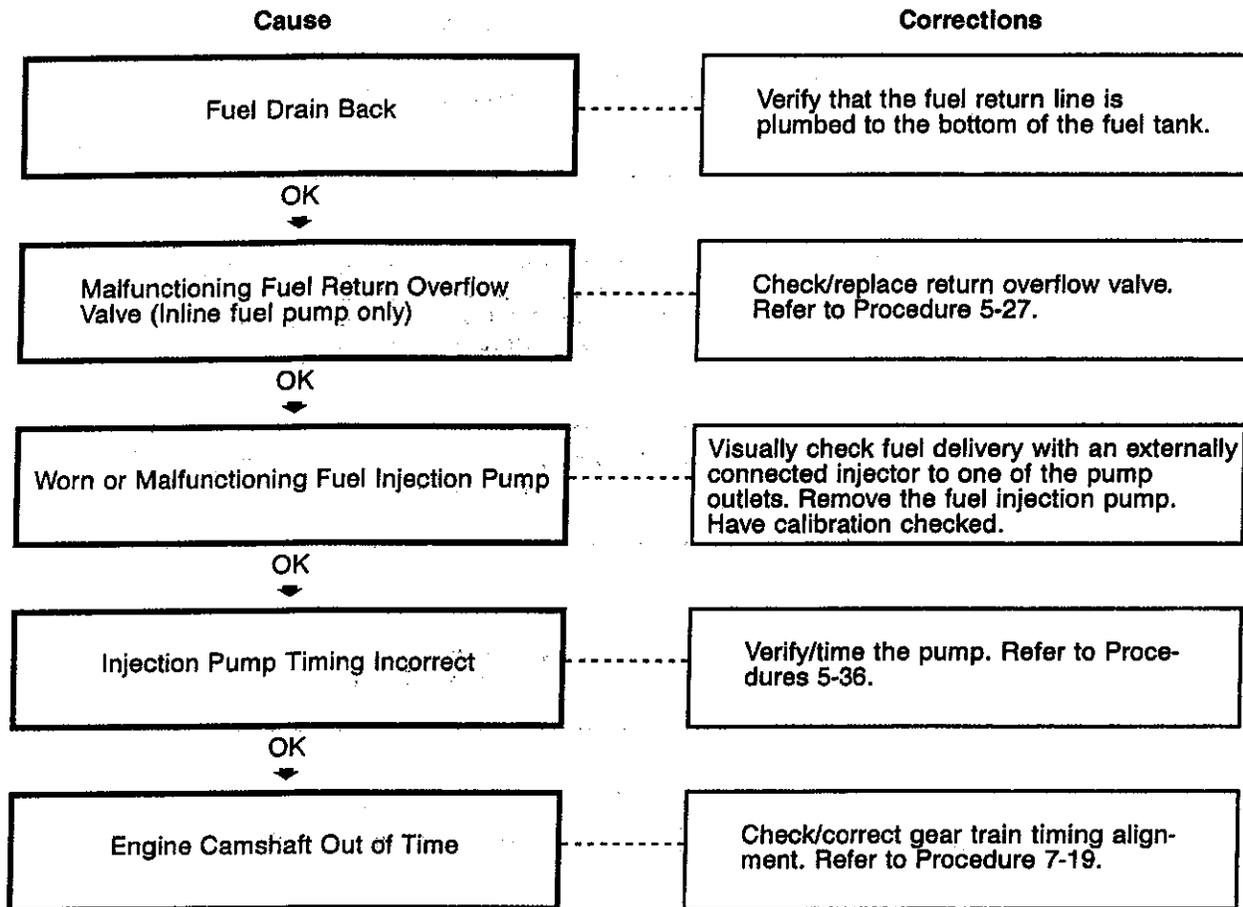
### Engine Will Not Crank Or Cranks Slowly



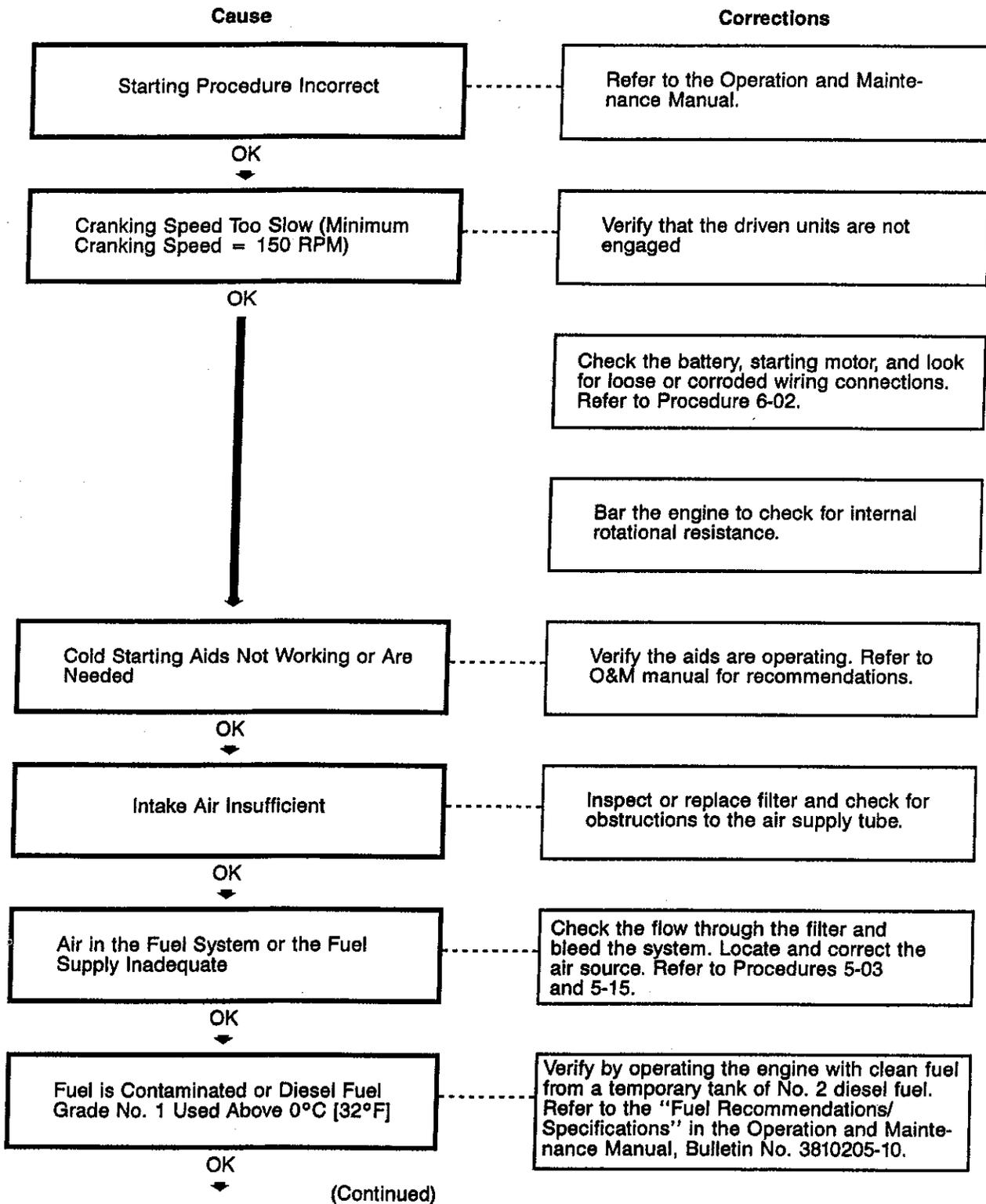
### Engine Cranks But Will Not Start - No Smoke From Exhaust



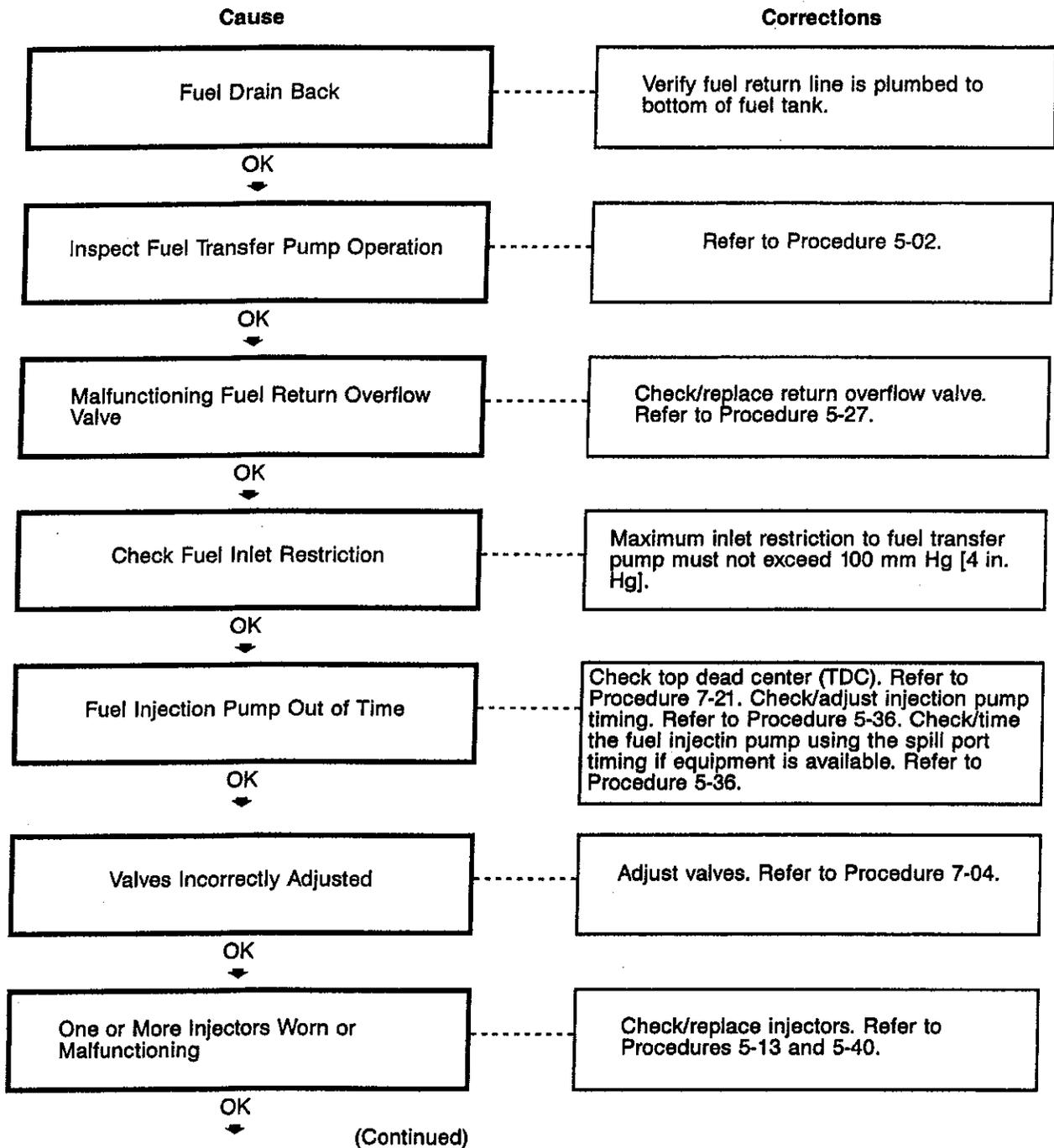
### Engine Cranks But Will Not Start - No Smoke From Exhaust (Continued)



### Engine Hard To Start Or Will Not Start - Smoke From Exhaust



### Engine Hard To Start Or Will Not Start - Smoke From Exhaust (Continued)



### Engine Hard To Start Or Will Not Start - Smoke From Exhaust (Continued)

Cause

Corrections

Engine Compression Low

Perform a compression check to identify the problem. Refer to Procedure 7-01.

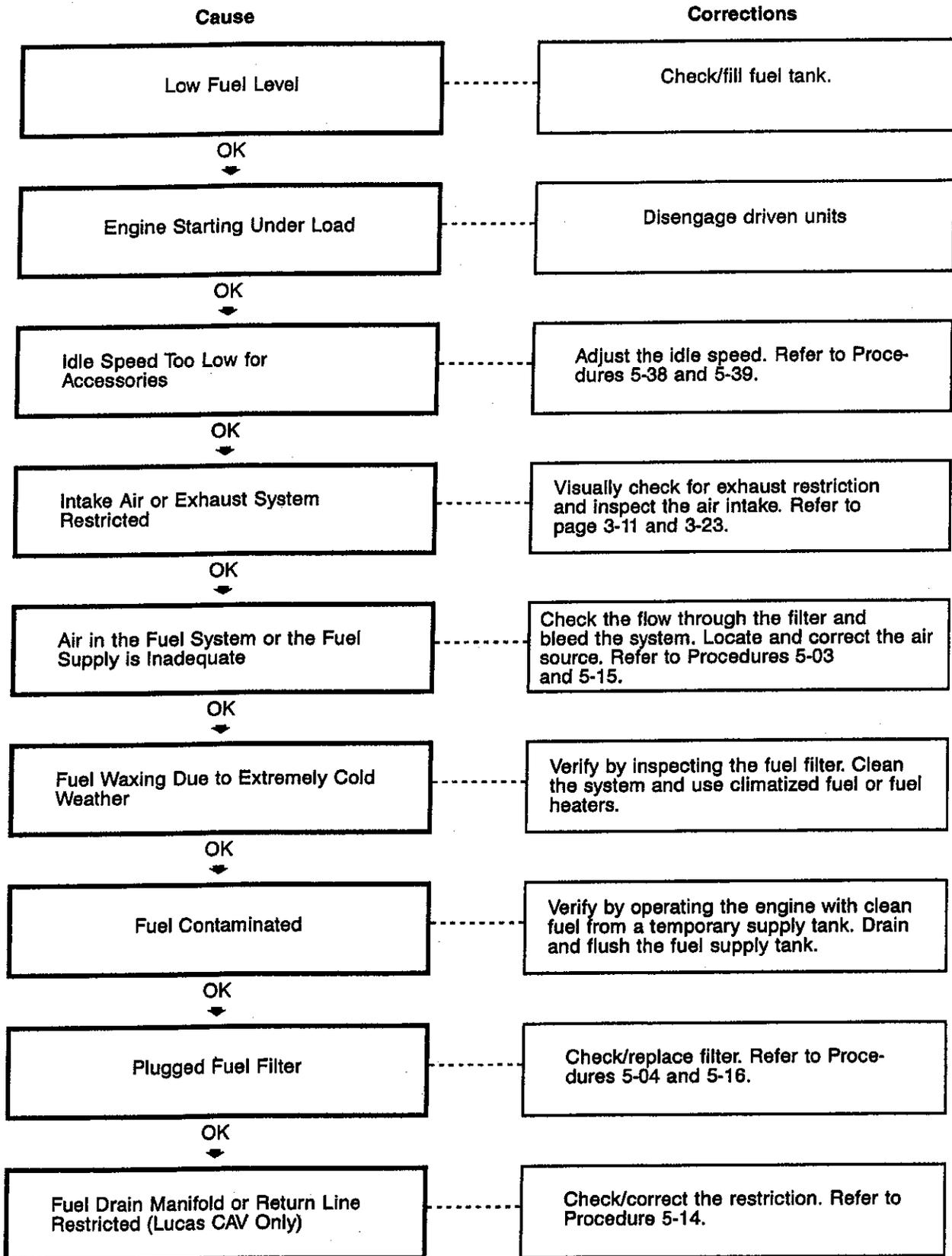
OK



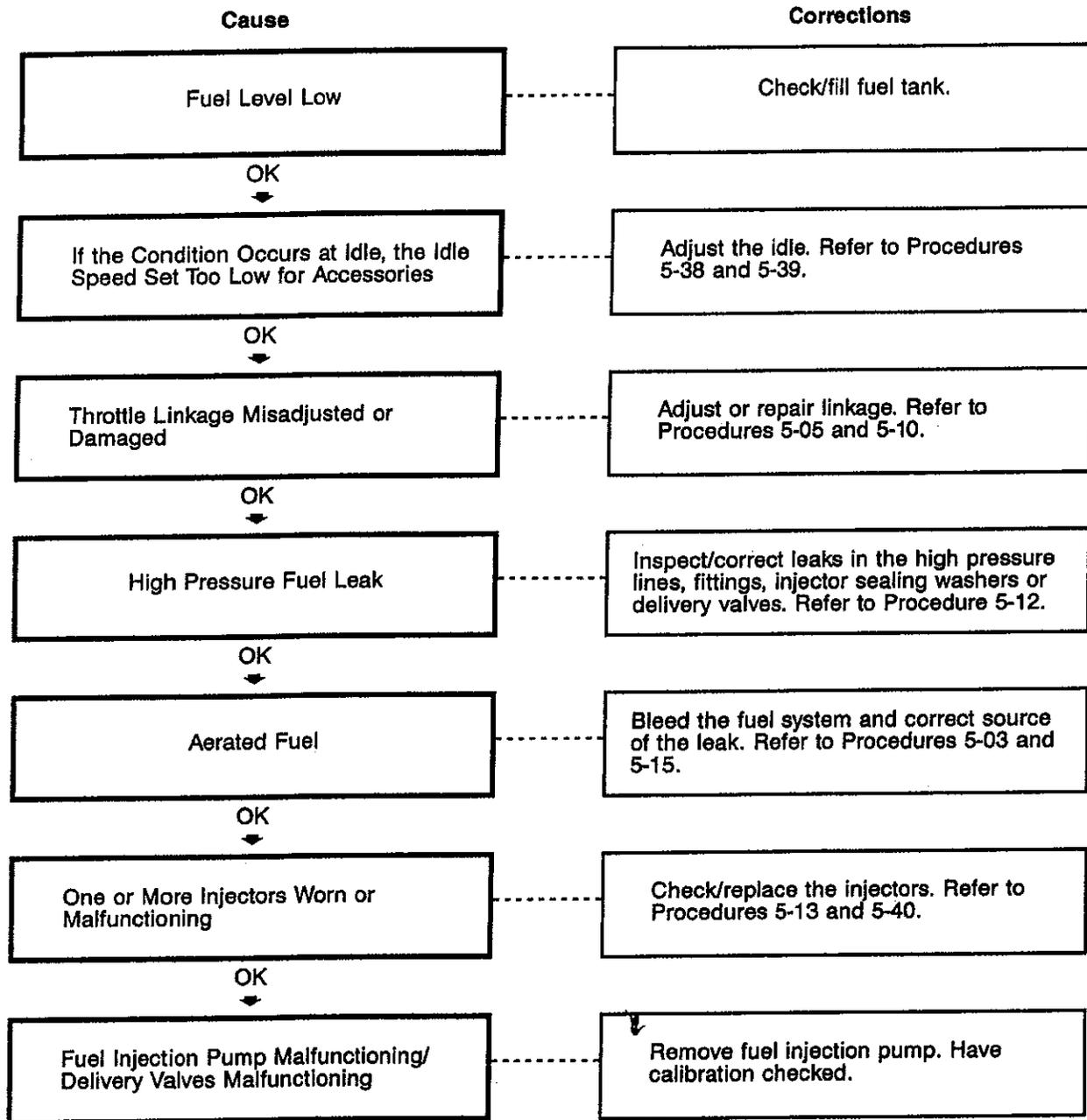
Fuel Injection Pump Malfunctioning/  
Delivery Valves Malfunctioning

Remove fuel injection pump. Have calibration checked.

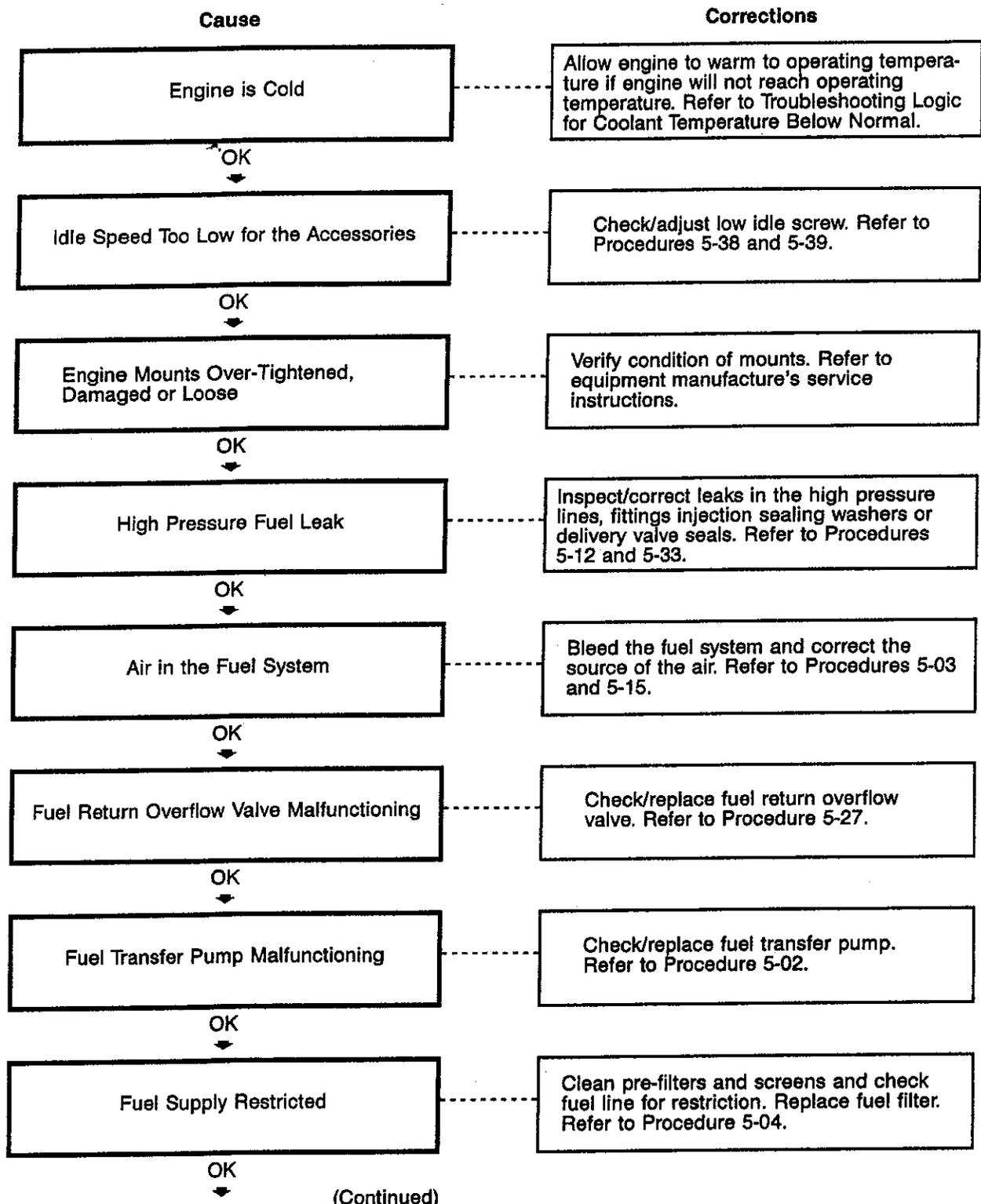
### Engine Starts But Will Not Keep Running



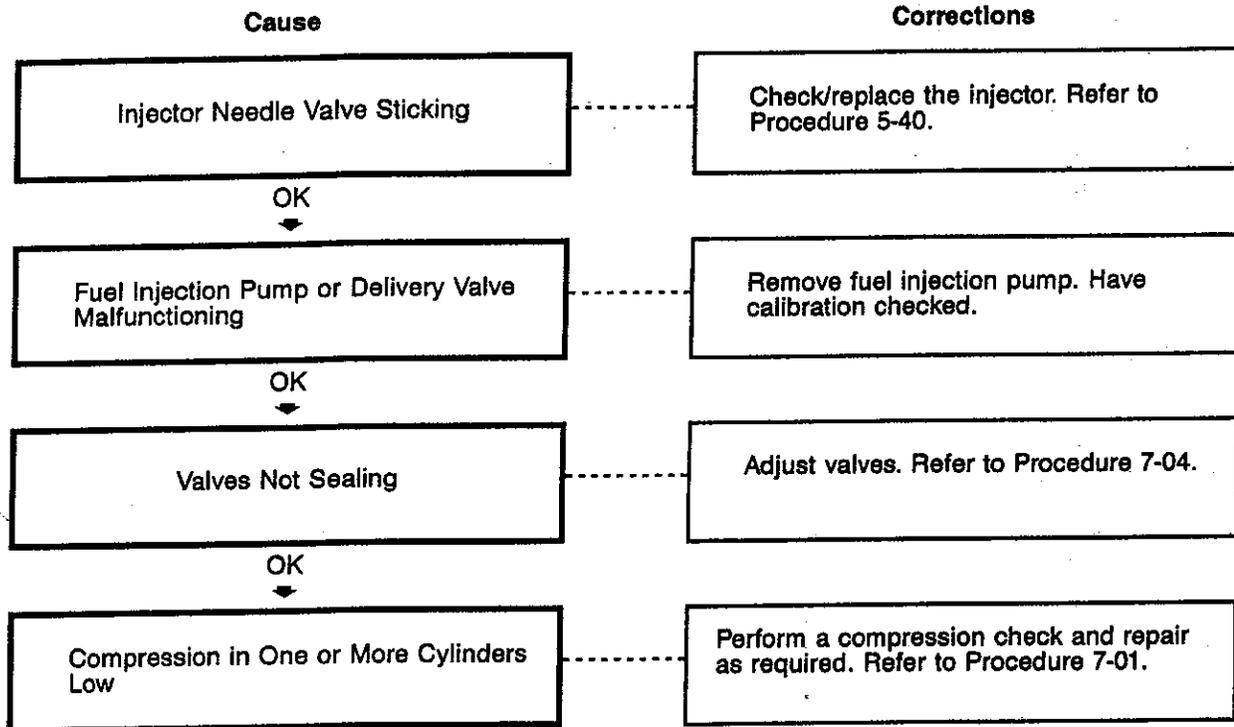
### Engine Surging (Speed Change)



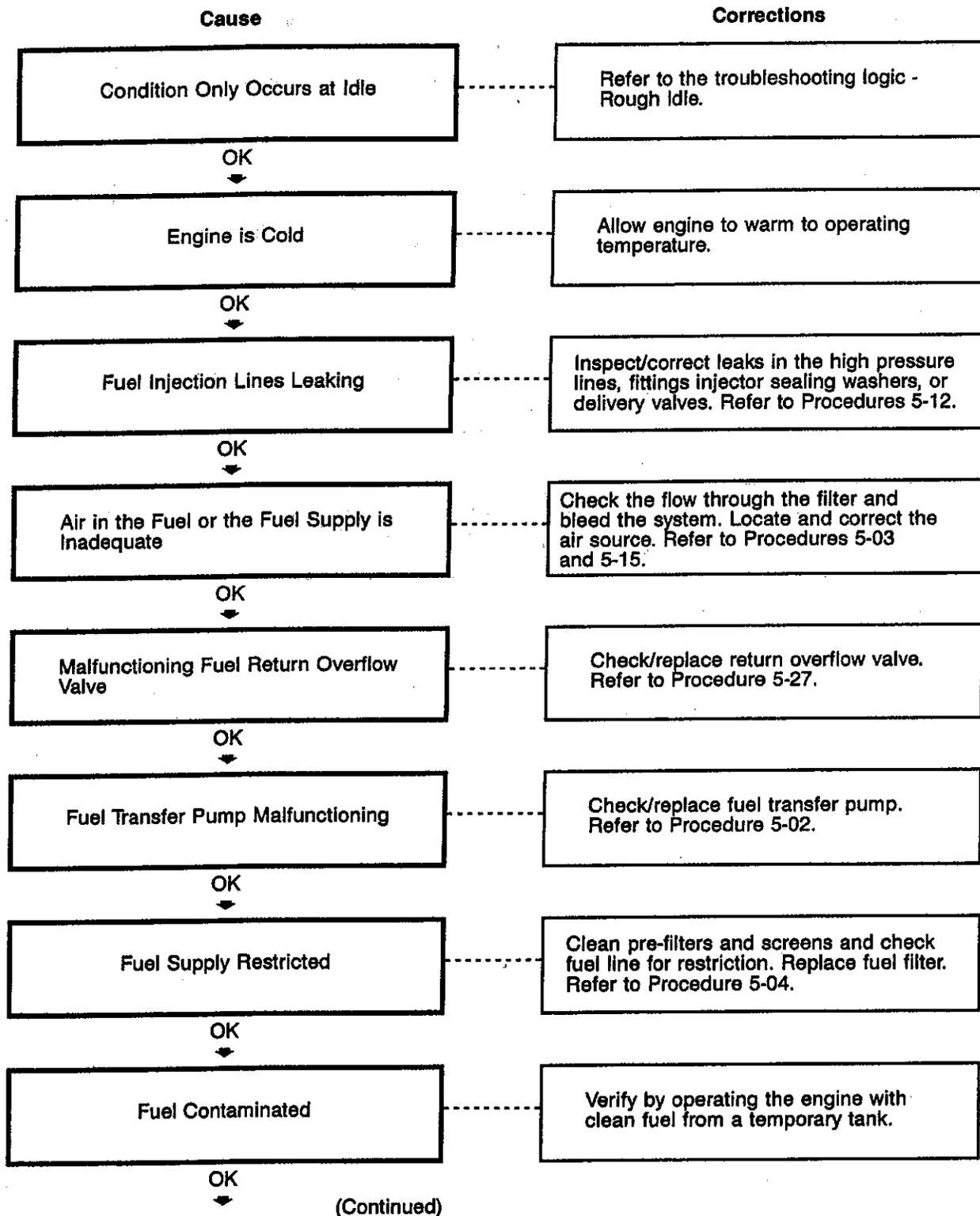
### Engine Idle Rough (Irregularly Firing Or Engine Shaking)



### Engine Idle Rough (Irregularly Firing Or Engine Shaking) (Continued)



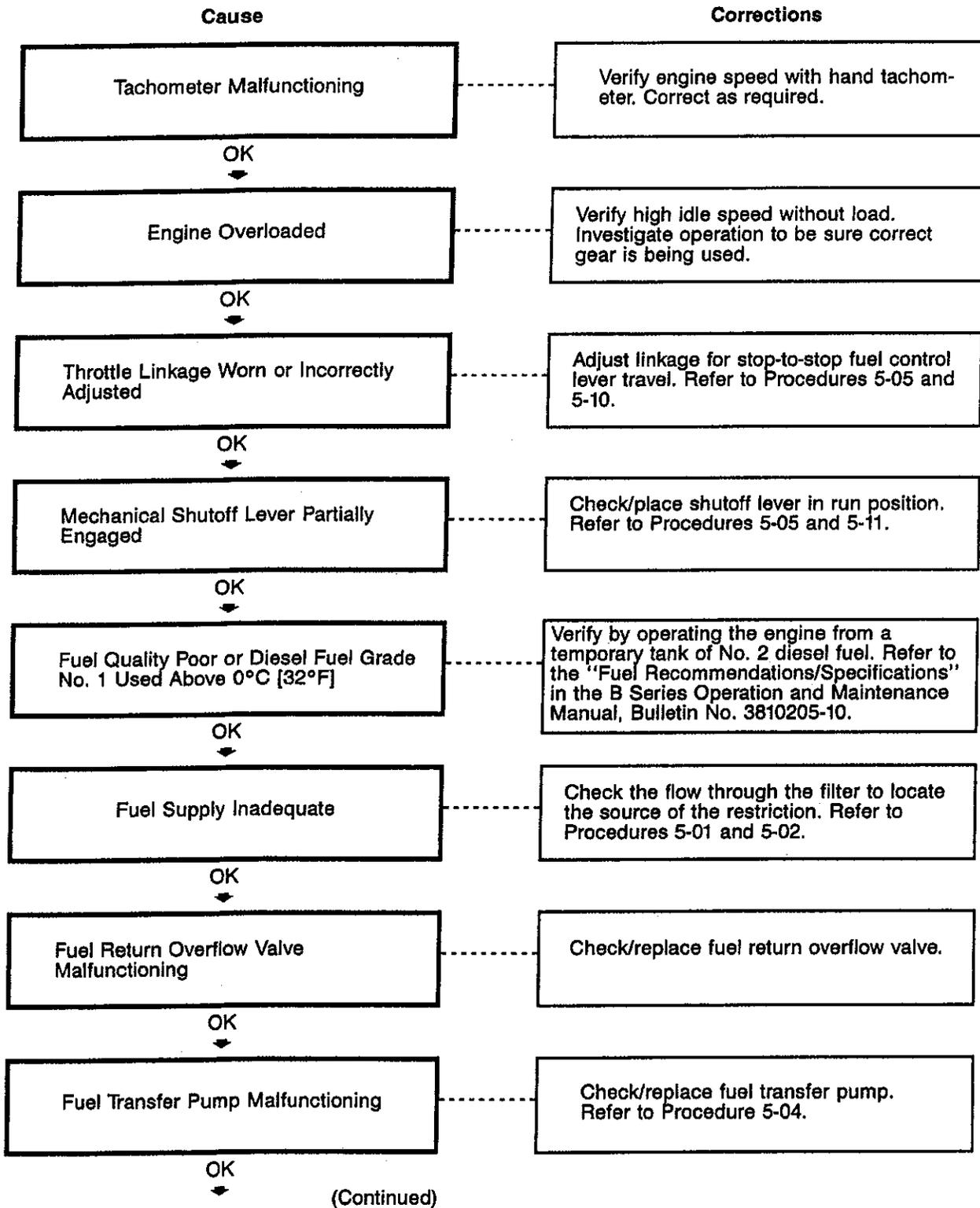
### Engine Runs Rough Or Misfiring



### Engine Runs Rough Or Misfiring (Continued)

Cause	Corrections
Valve Adjustment Incorrect	Check for a bent push rod and adjust valves. Refer to Procedures 7-03 and 7-04.
OK ↓	
Injection Pump Timing Incorrectly Adjusted	Check top dead center (TDC). Refer to Procedure 7-21. Check/adjust injection pump timing. Refer to Procedure 5-36. Check/time the fuel injection pump using the spill port timing if equipment is available. Refer to Procedure 5-36.
OK ↓	
Compression in One or More Cylinders Low	Perform a compression check and repair as required. Refer to Procedure 7-01.
OK ↓	
Injectors Malfunctioning	Check/replace injectors. Refer to Procedures 5-13 and 5-40.
OK ↓	
Injection Pump (Delivery Valves) Defective	Remove fuel injection pump. Have calibration checked.
OK ↓	
Camshaft Out of Time	Check/correct gear train timing alignment. Refer to Procedure 5-36.
OK ↓	
Camshaft or Tappets Damaged	Inspect camshaft and tappets. Refer to Procedure 7-19.

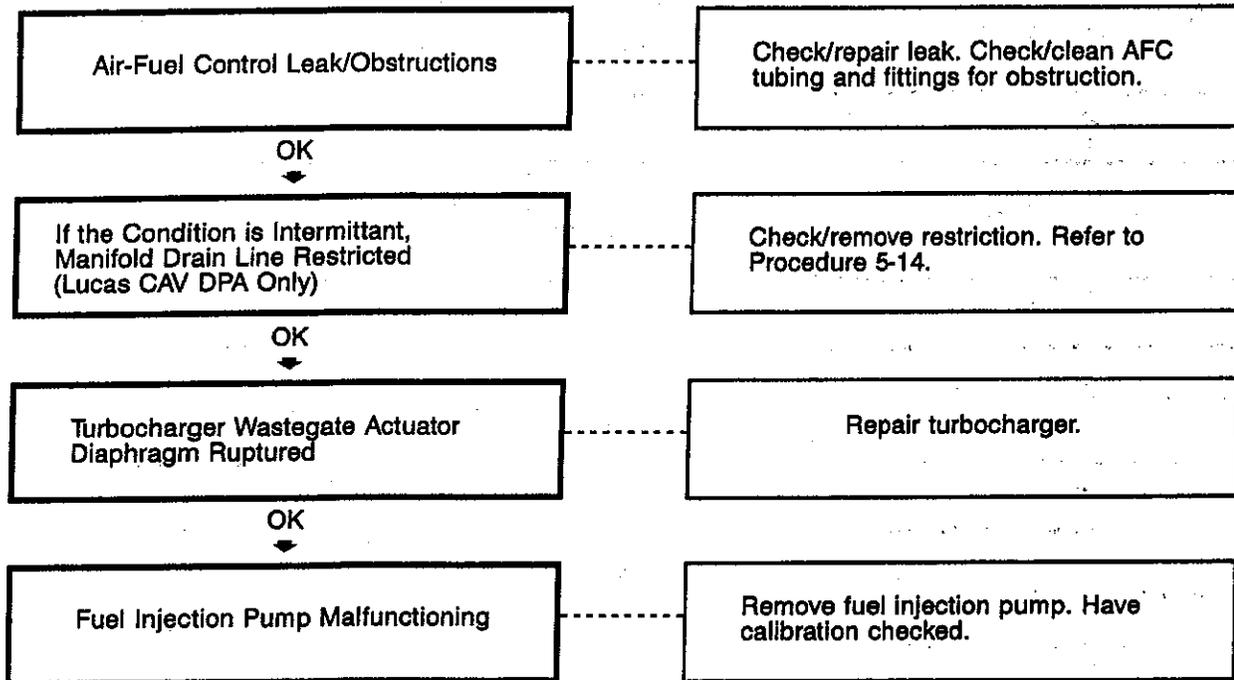
### Engine RPM Will Not Reach Rated Speed



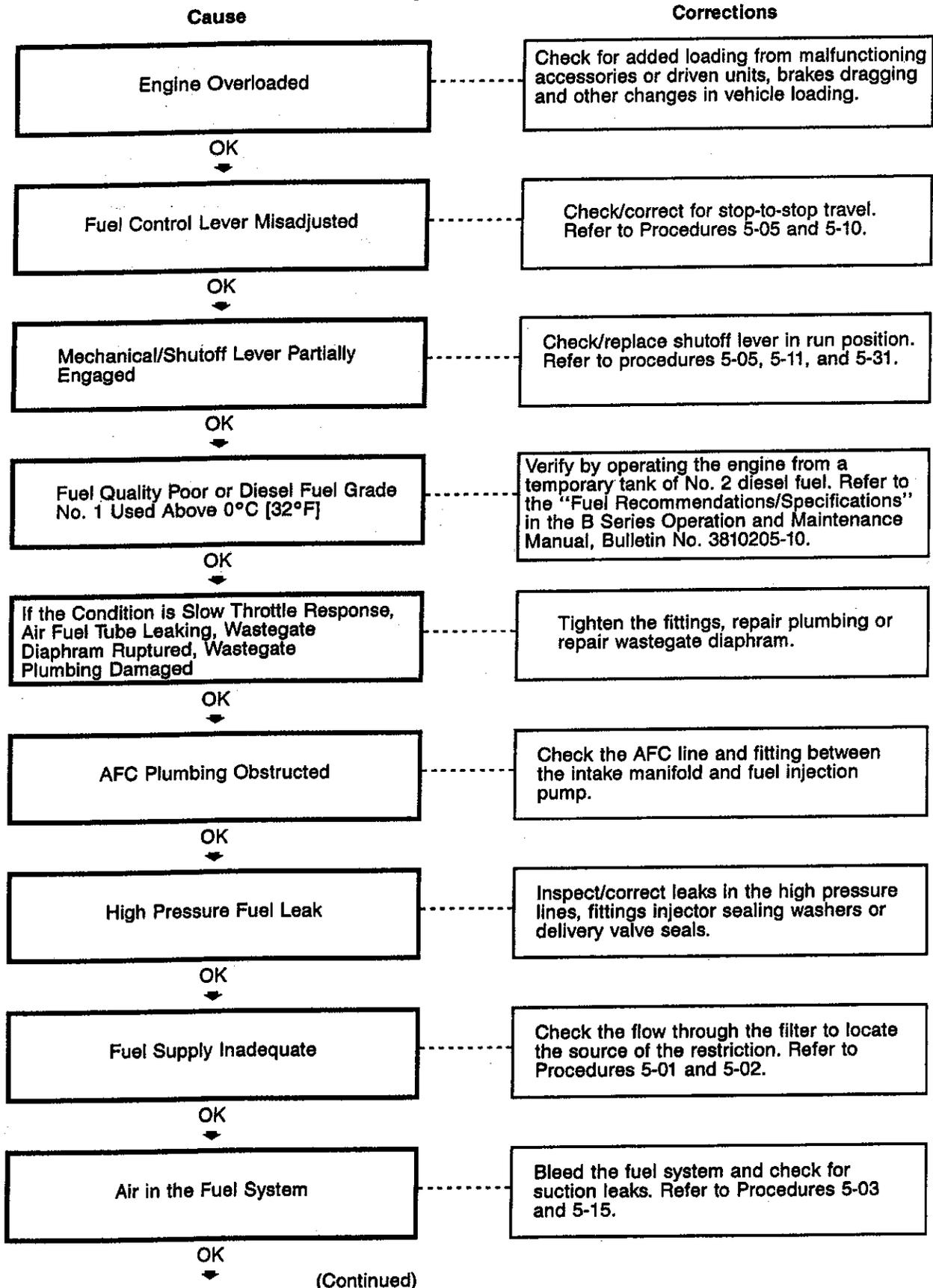
### Engine RPM Will Not Reach Rated Speed (Continued)

Cause

Corrections

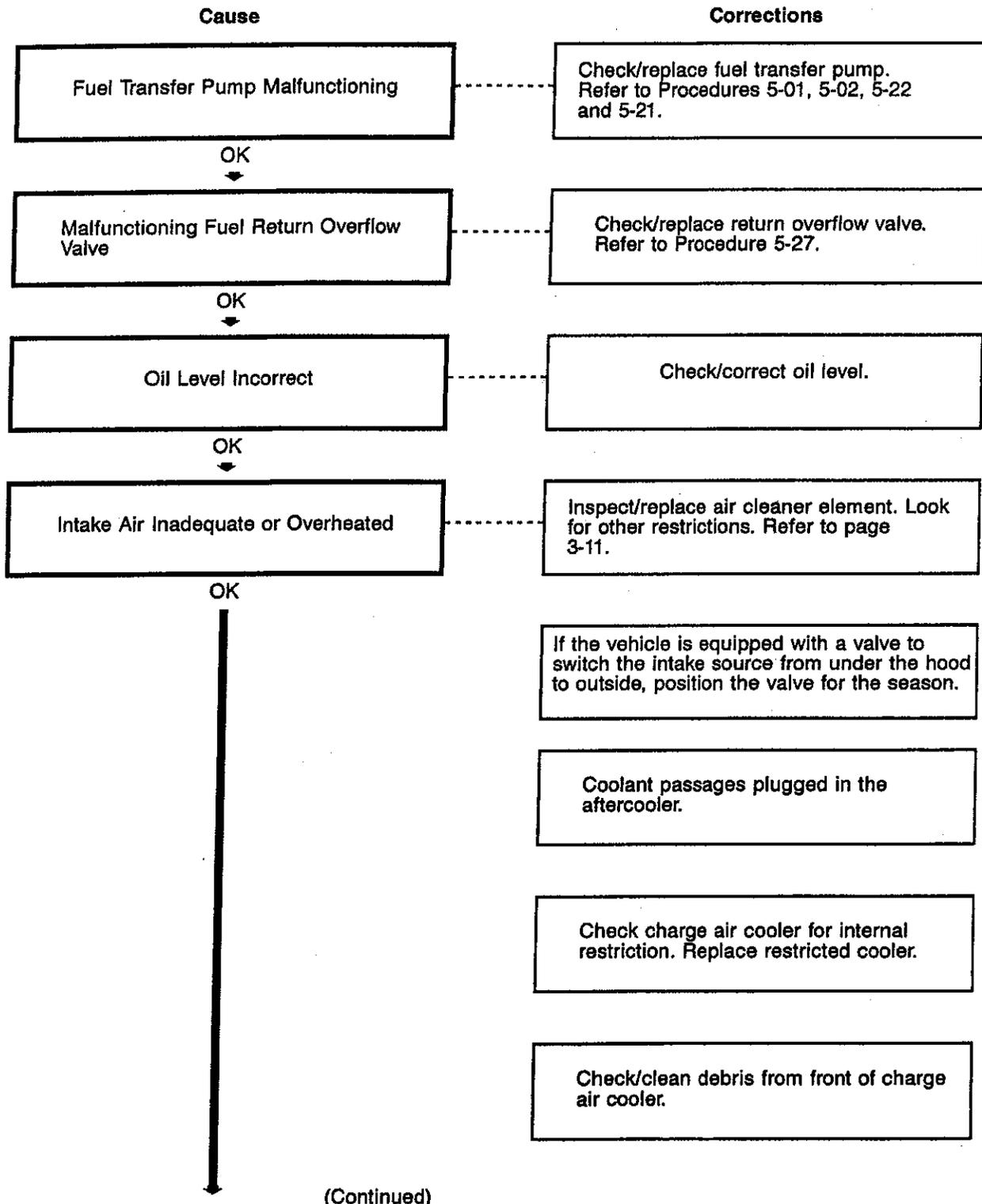


### Engine Power Output Low

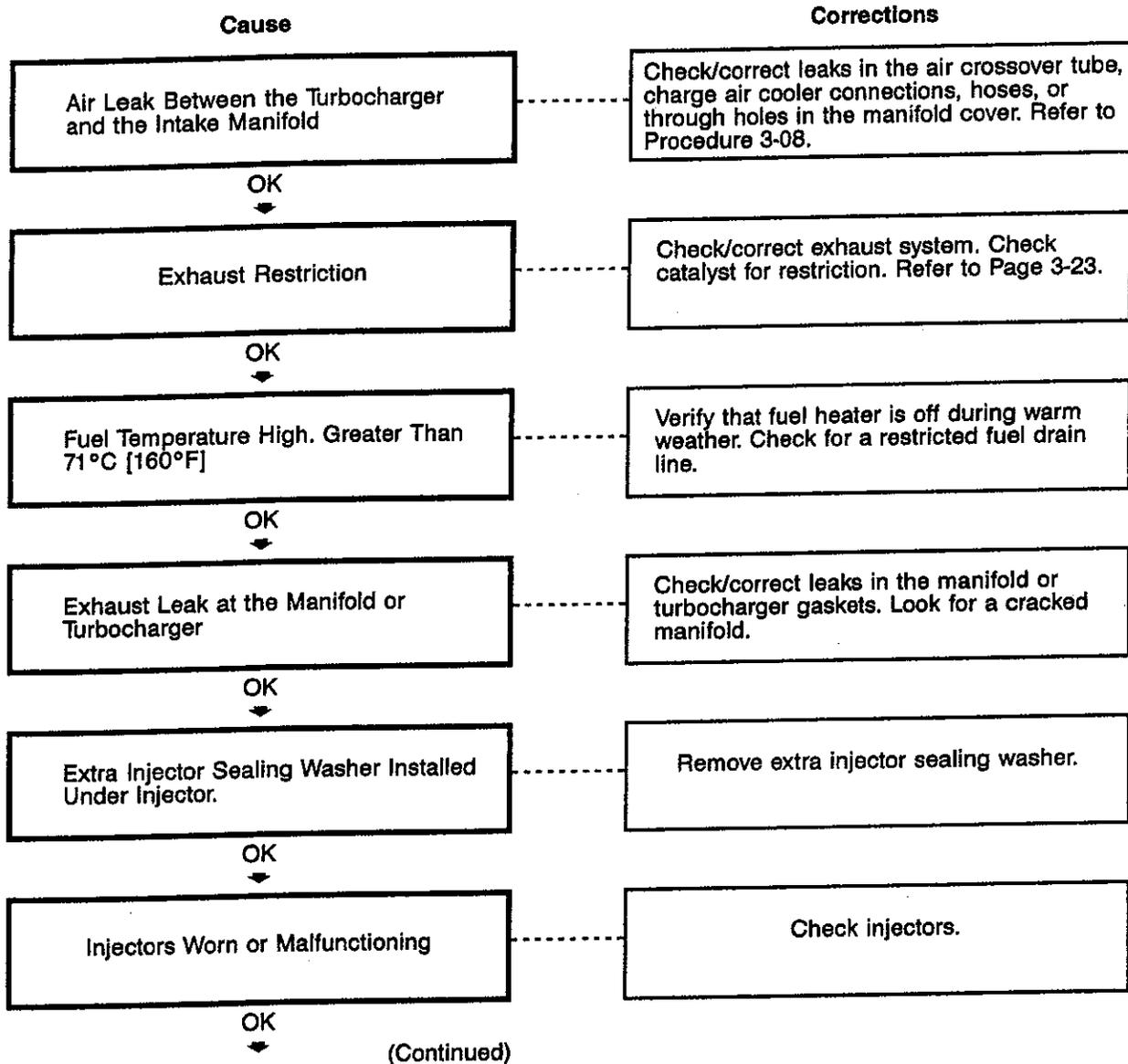


(Continued)

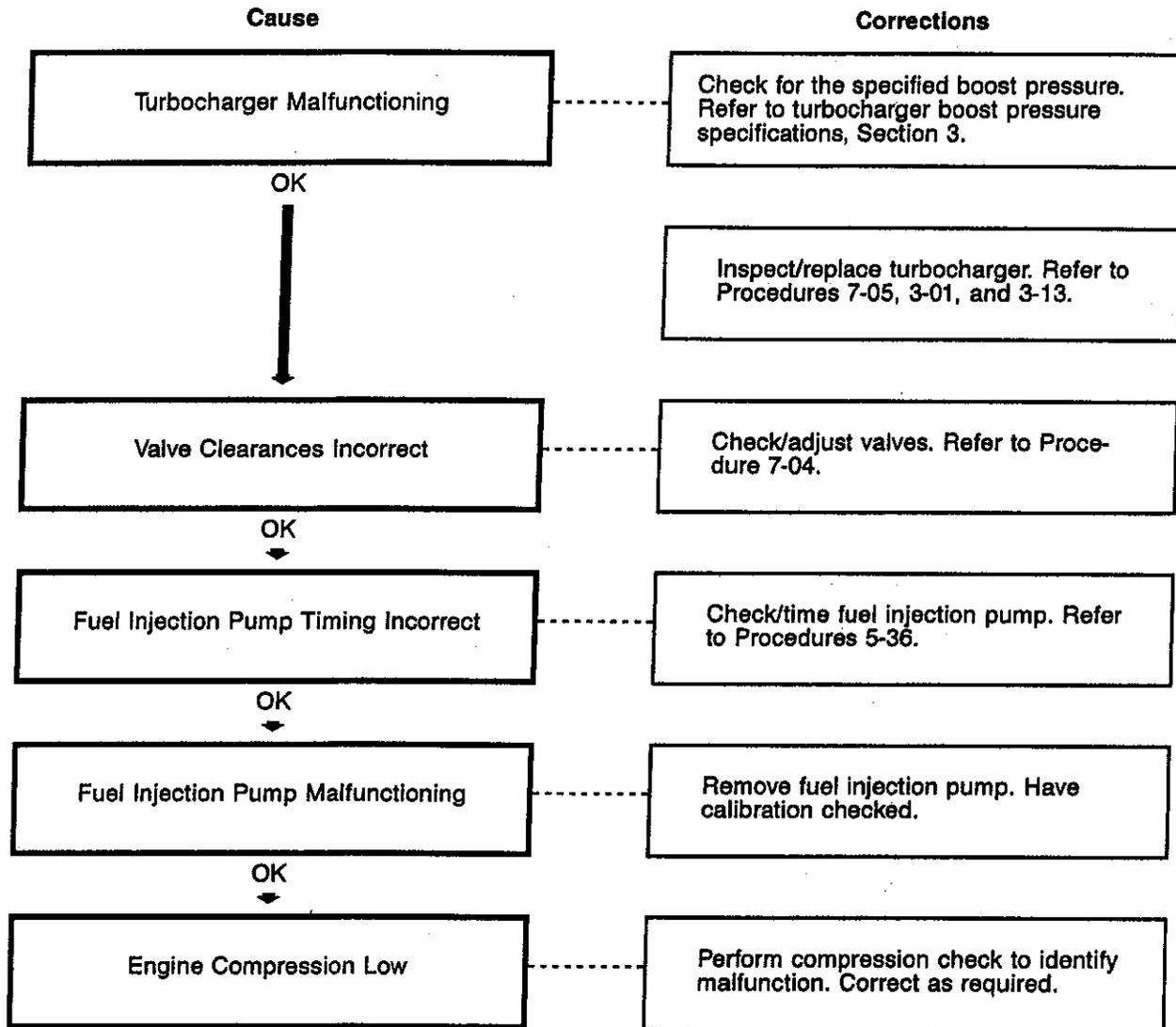
### Engine Power Output Low(Continued)



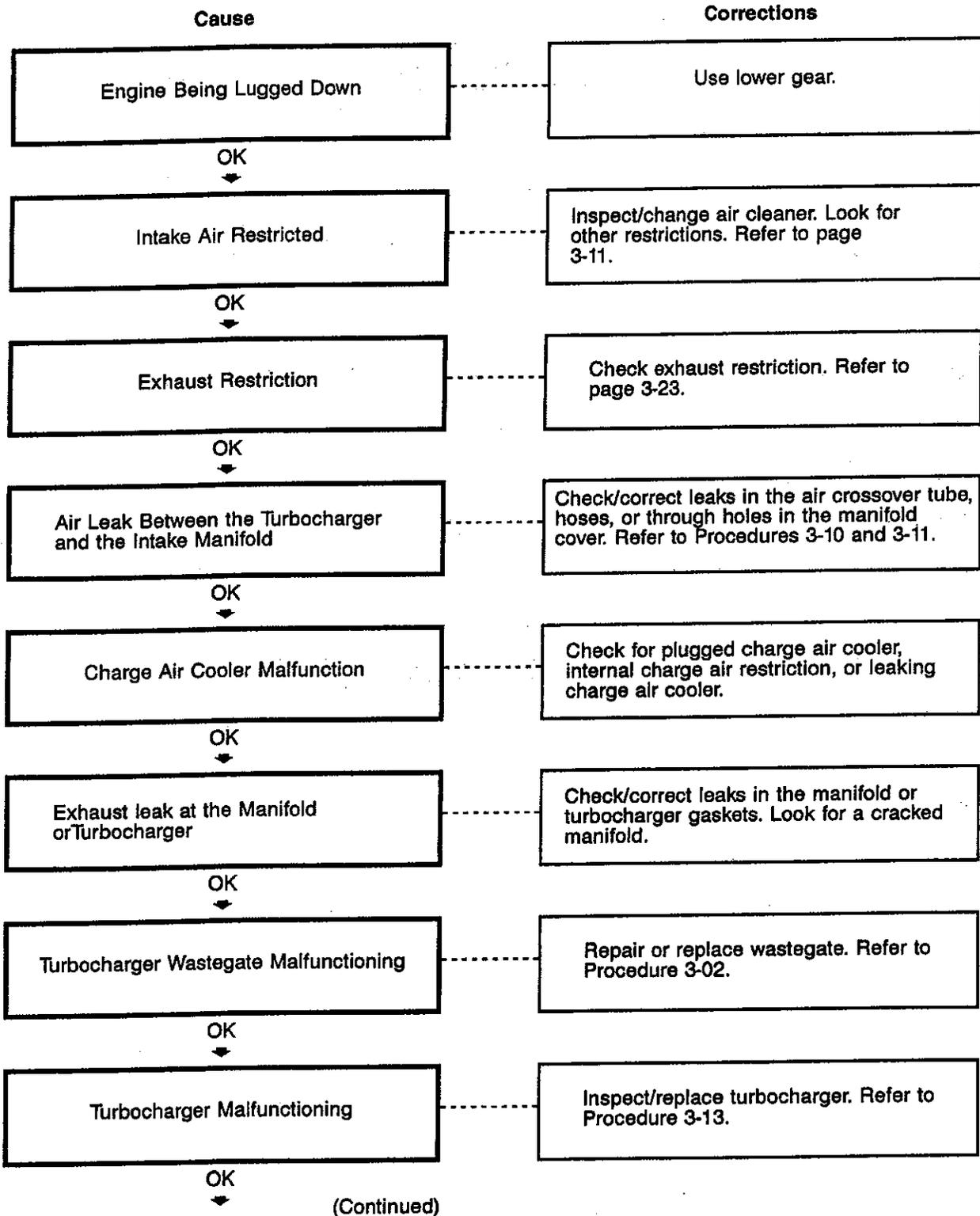
### Engine Power Output Low (Continued)



### Engine Power Output Low (Continued)



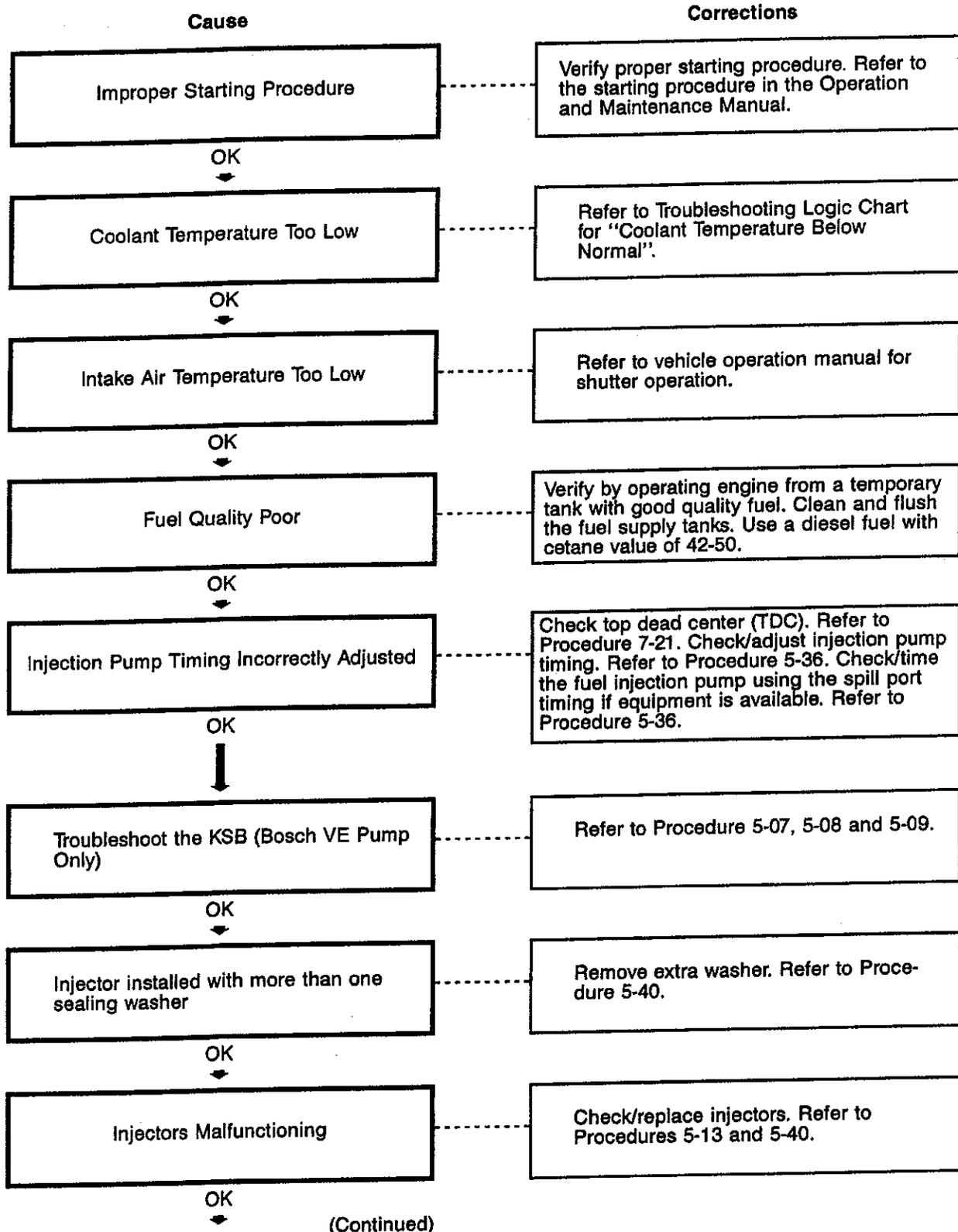
### Exhaust Black Smoke Excessive



### Exhaust Smoke Black Excessive (Continued)

Cause	Corrections
Injector Installed With More Than One Sealing Washer	Remove extra washer. Refer to Procedure 5-40.
OK ↓	
7 mm Injector Installed With a 9 mm Sealing Washer	Remove the injector and install the proper sealing washer. Refer to Procedure 5-40.
OK ↓	
Injectors Malfunctioning	Replace injectors. Refer to Procedure 5-40.
OK ↓	
Fuel Injection Pump Malfunctioning or Overfueled	Remove fuel injection pump. Have calibration checked.
OK ↓	
Piston Rings Not Sealing (Blue Smoke)	Perform a compression check. Correct as required. Refer to Procedure 7-01.
OK ↓	
Fuel Injection Pump Timing Incorrect	Check/time fuel injection pump. Refer to procedure 7-20 and 5-36.

### Exhaust White Smoke Excessive



### Exhaust White Smoke Excessive (Continued)

**Cause**

**Corrections**

Coolant Leaking Into Combustion Chamber

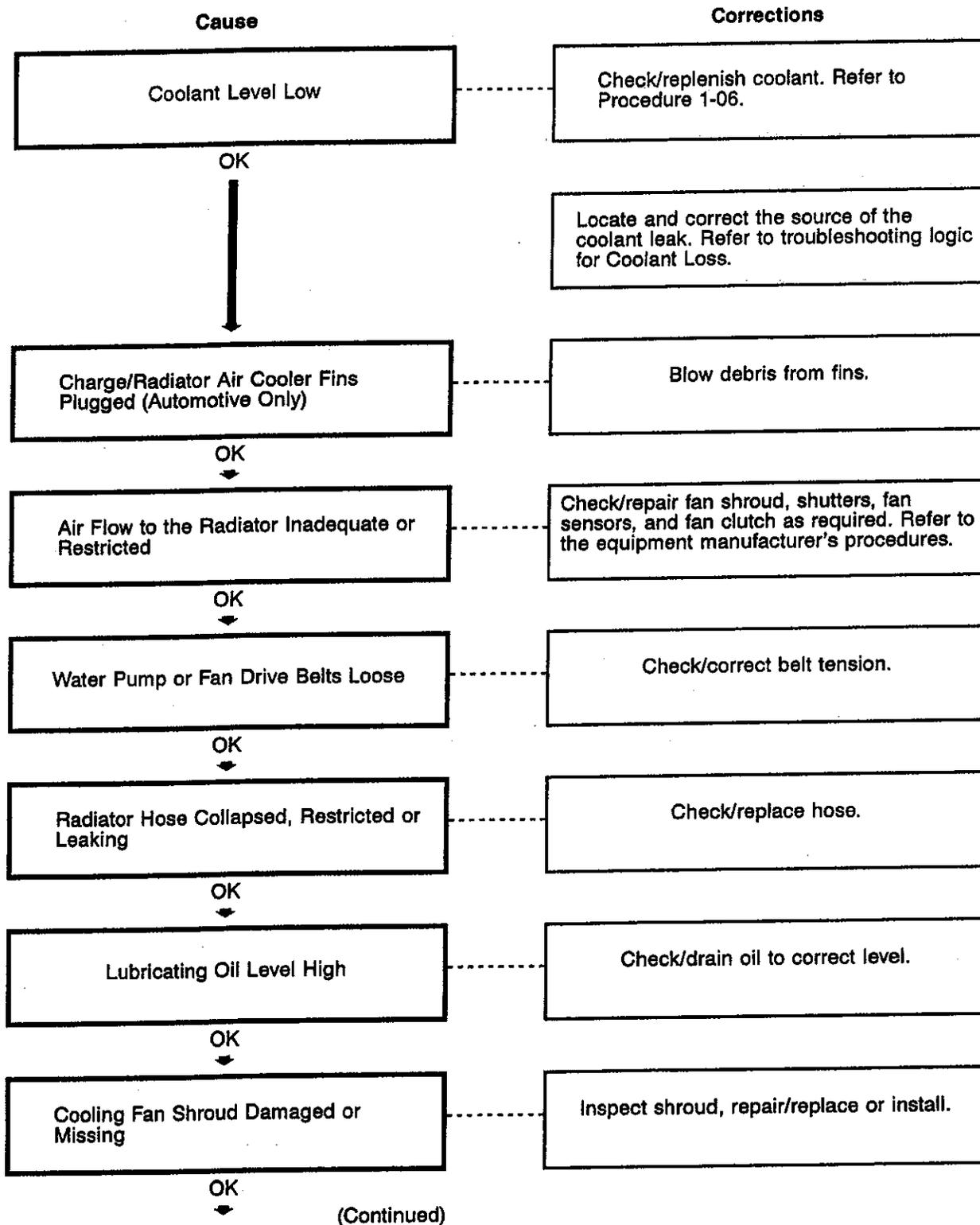
Refer to Troubleshooting Logic for Coolant Loss.

OK  
↓

Fuel Injection Pump Malfunctioning/  
Delivery Valves Malfunctioning

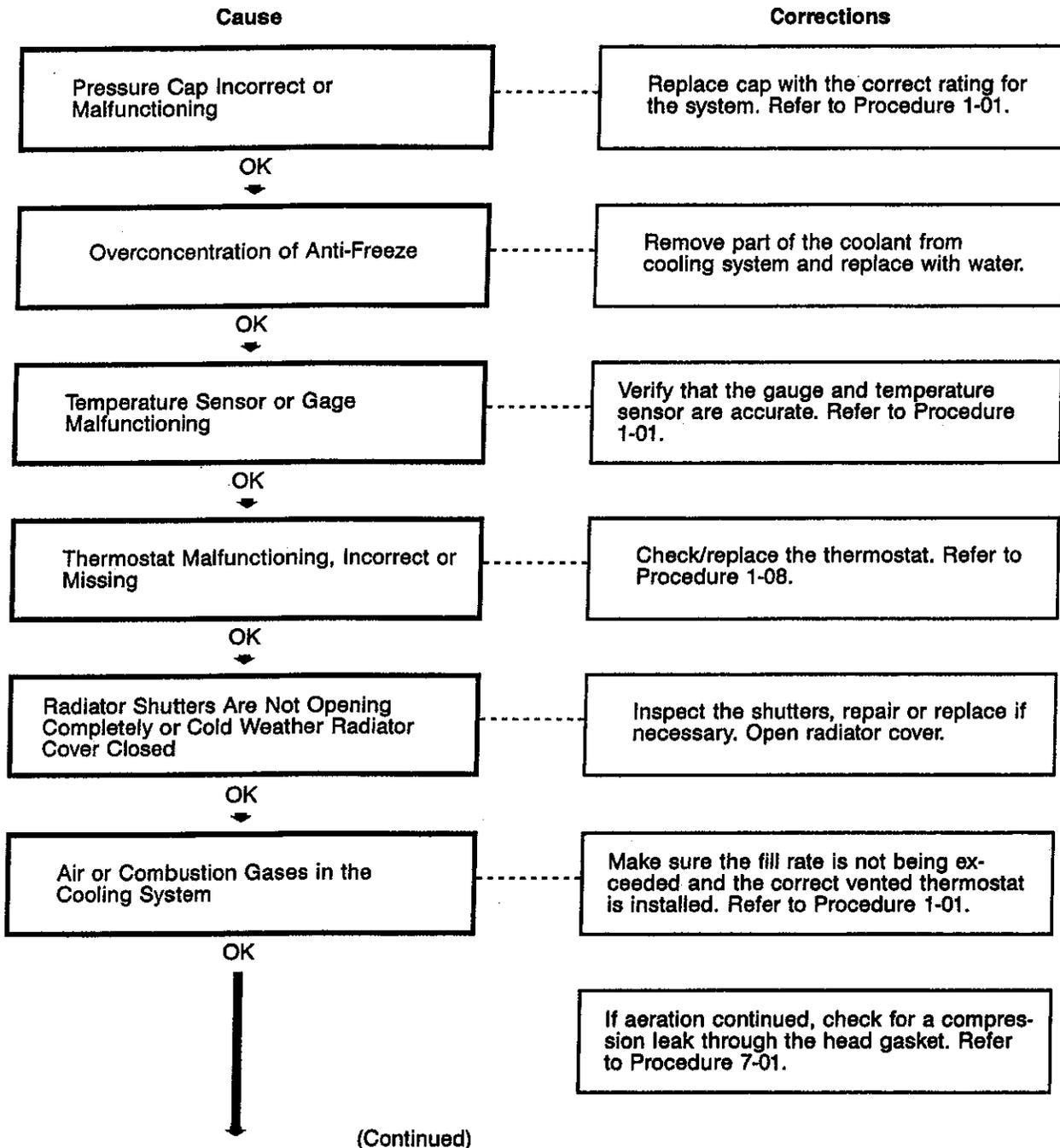
Remove fuel injection pump. Have calibration checked.

### Coolant Temperature Above Normal - Gradual Overheat

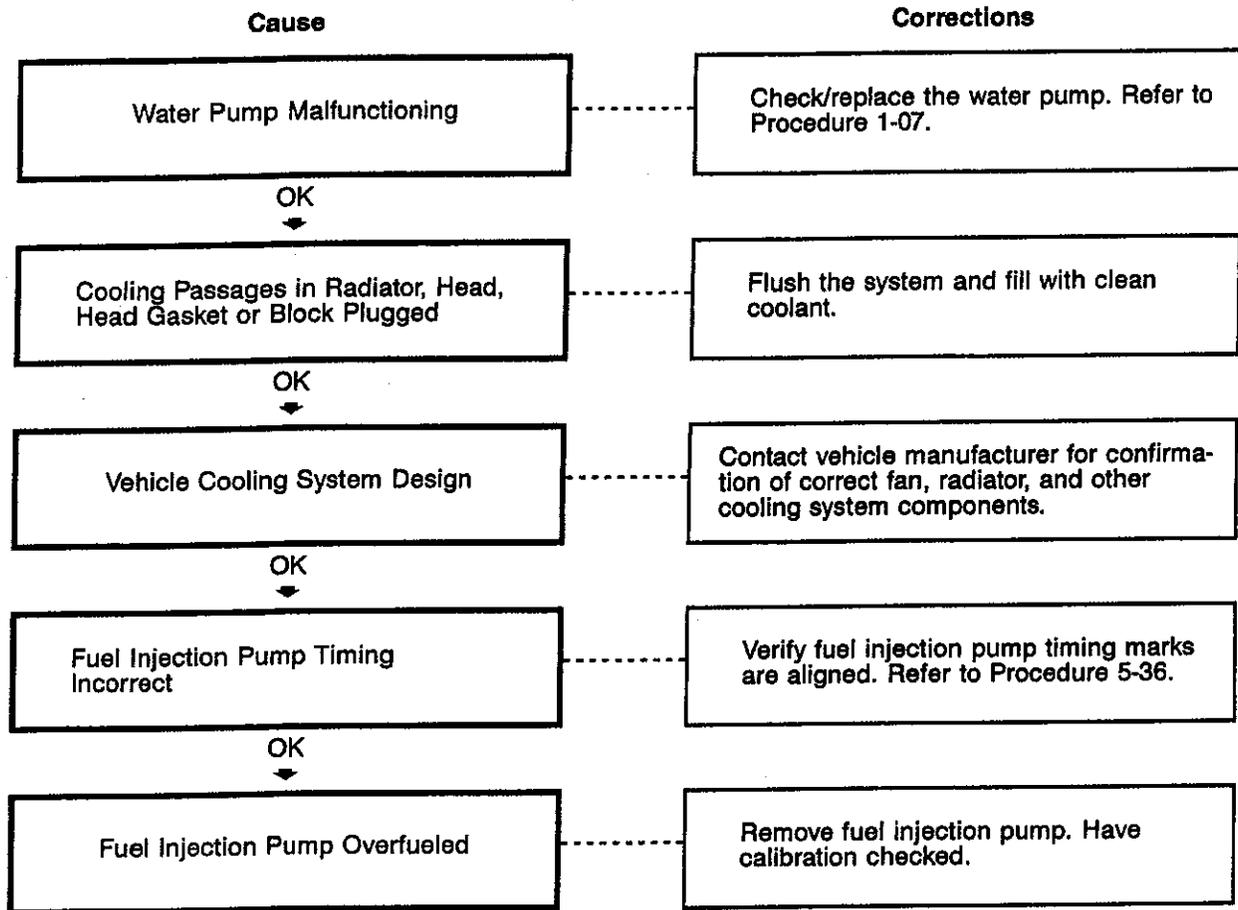


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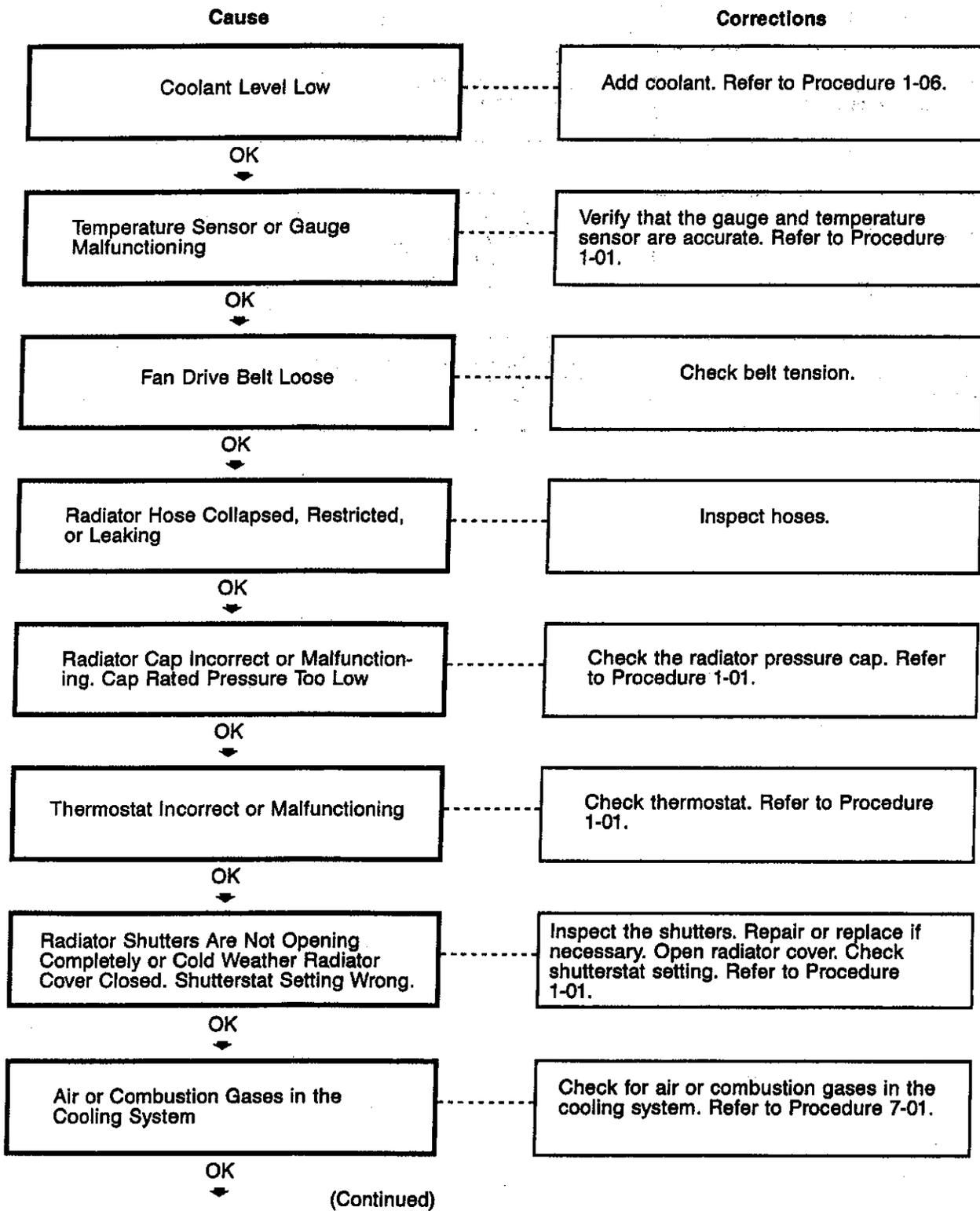
### Coolant Temperature Above Normal - Gradual Overheat (Continued)



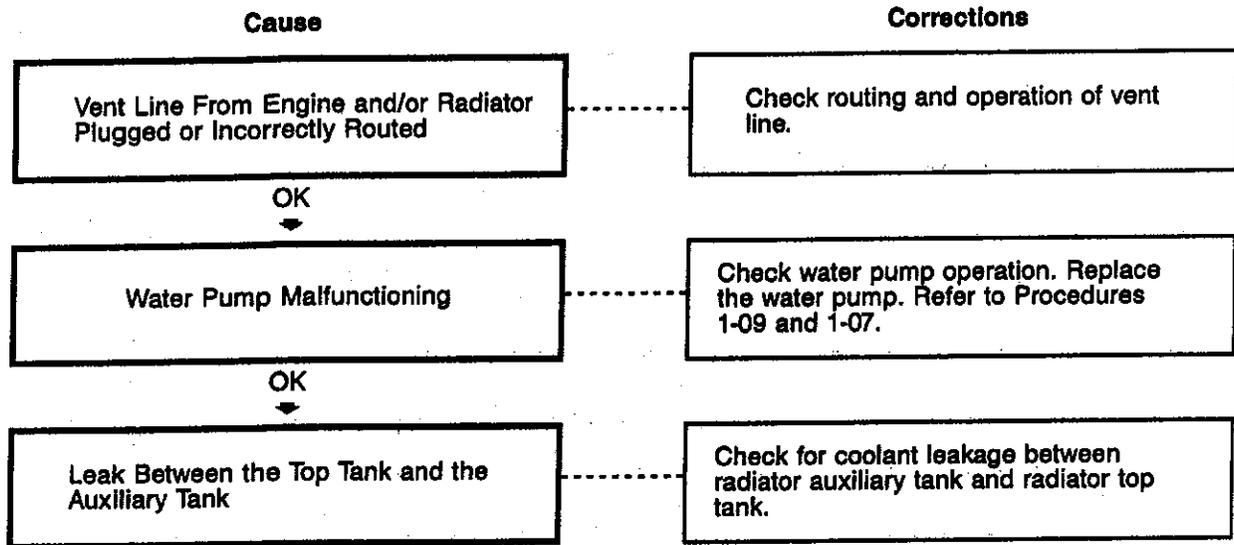
### Coolant Temperature Above Normal - Gradual Overheat (Continued)



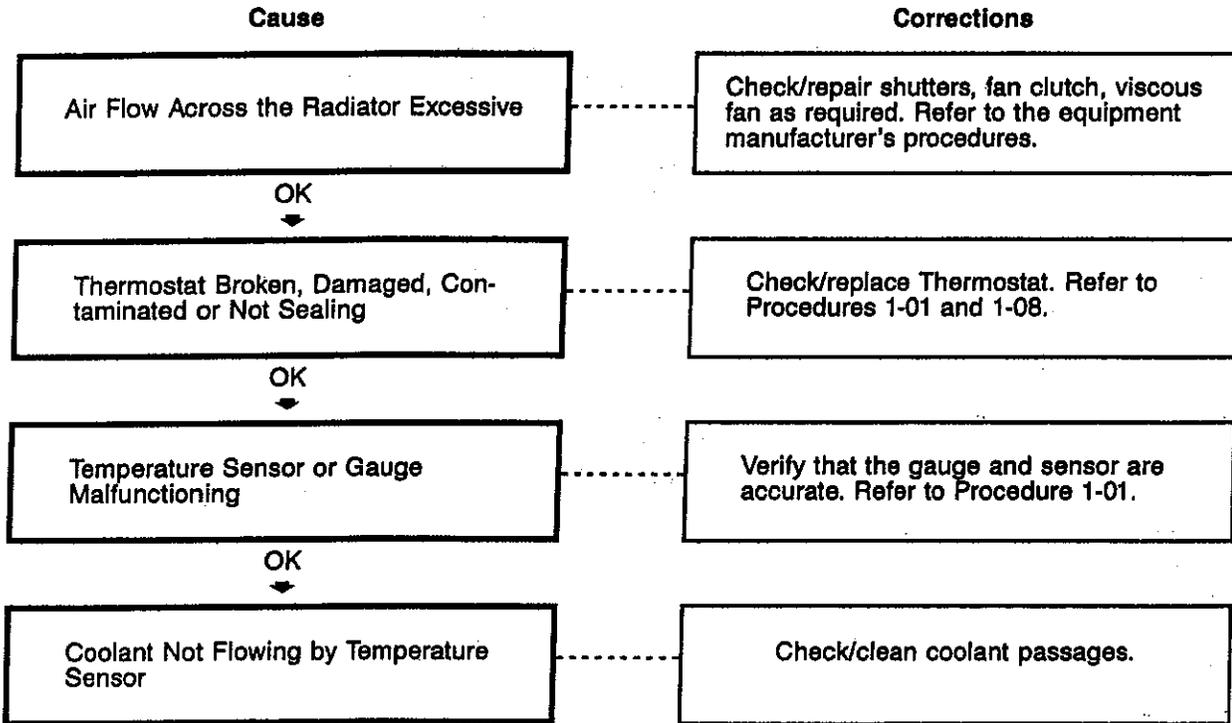
### Coolant Temperature Above Normal - Sudden Overheat



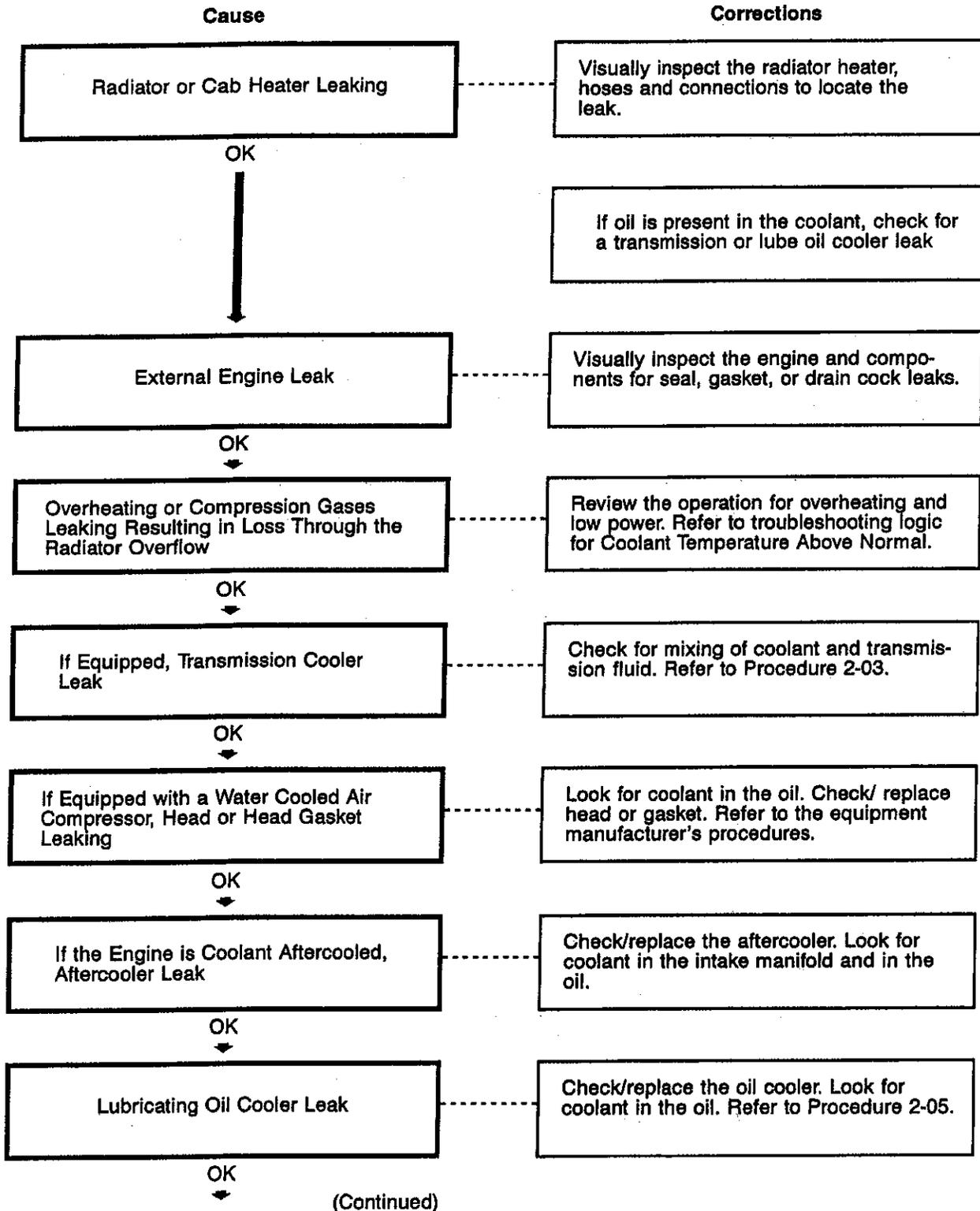
### Coolant Temperature Above Normal - Sudden Overheat (Continued)



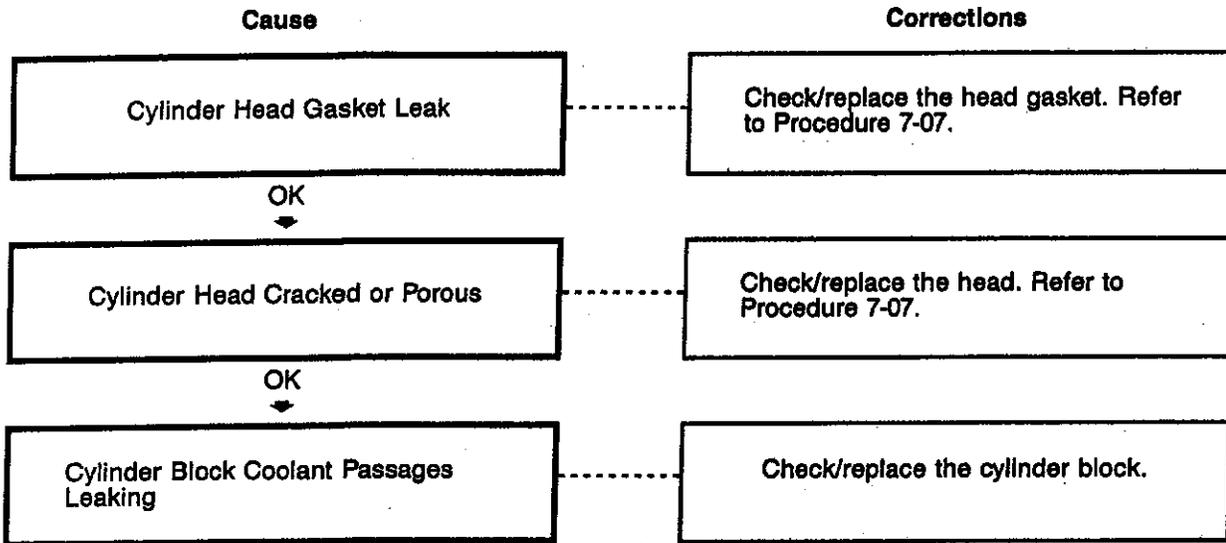
### Coolant Temperature Below Normal



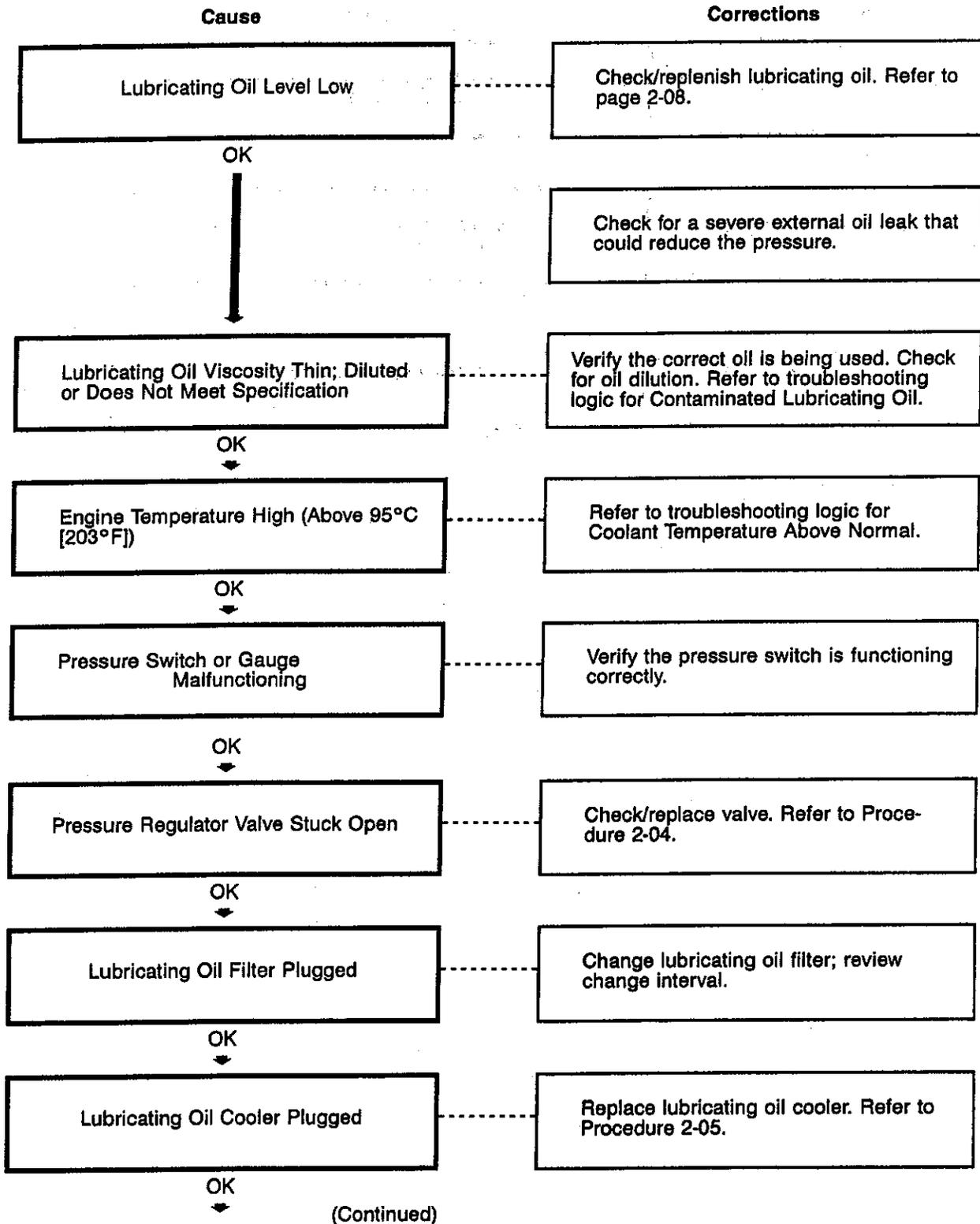
### Coolant Loss



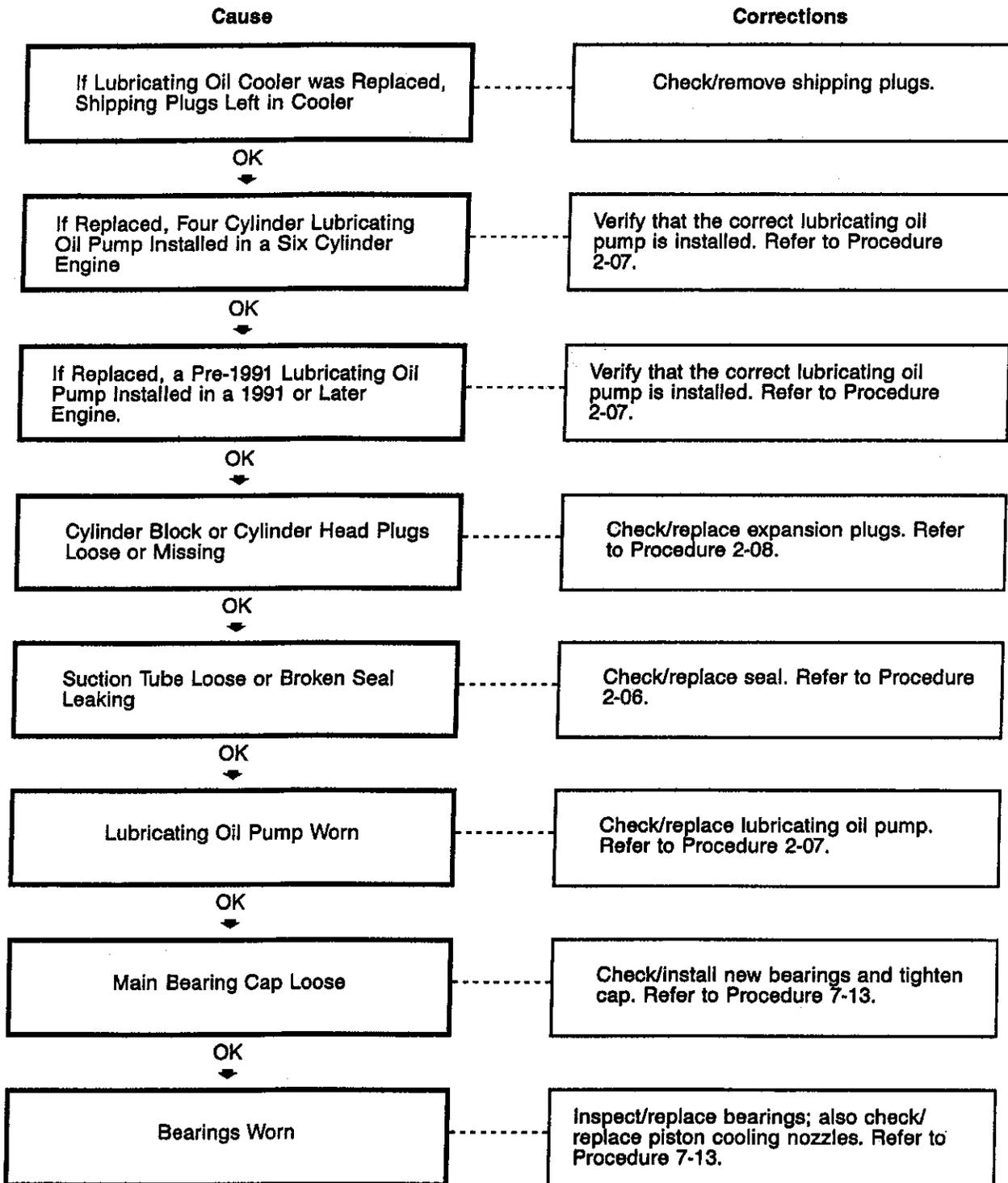
### Coolant Loss (Continued)



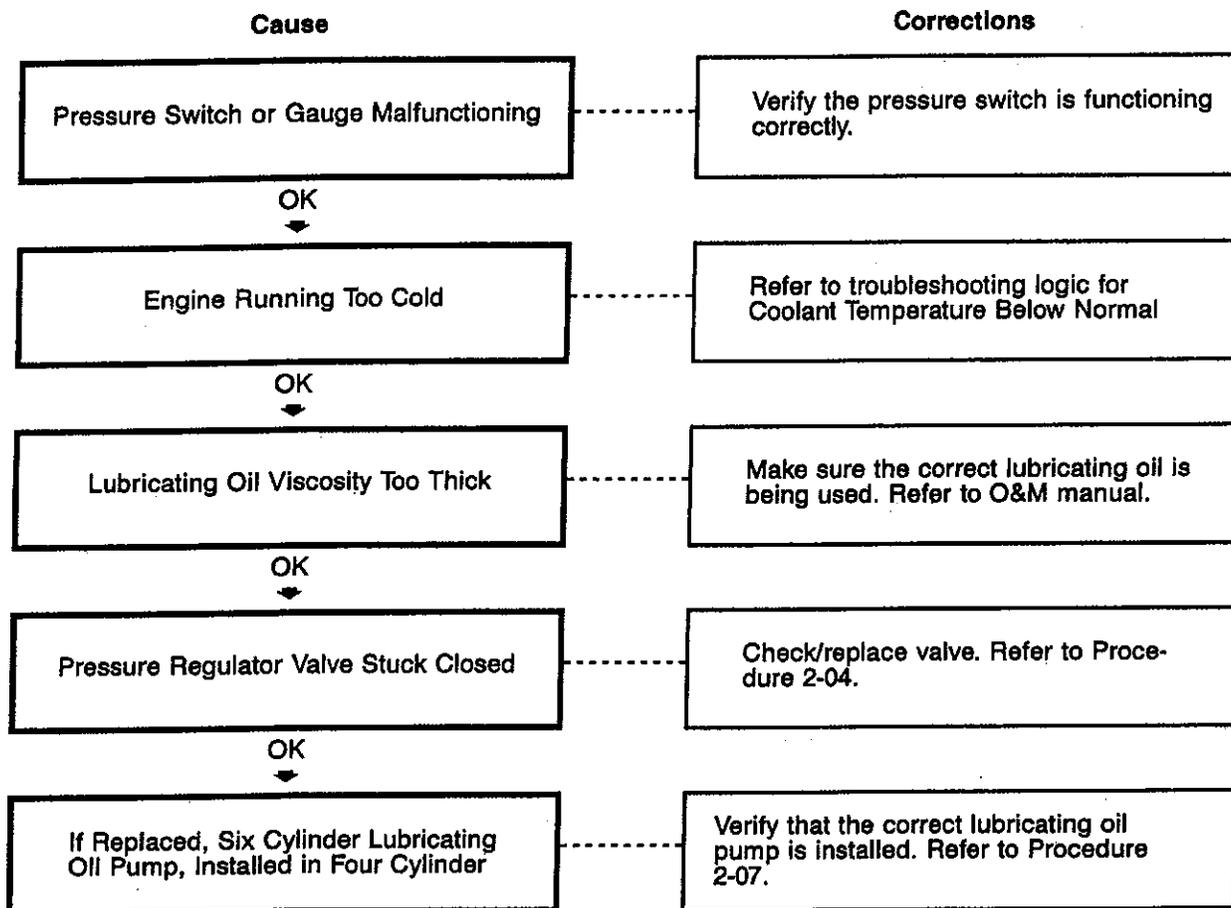
### Lubricating Oil Pressure Low



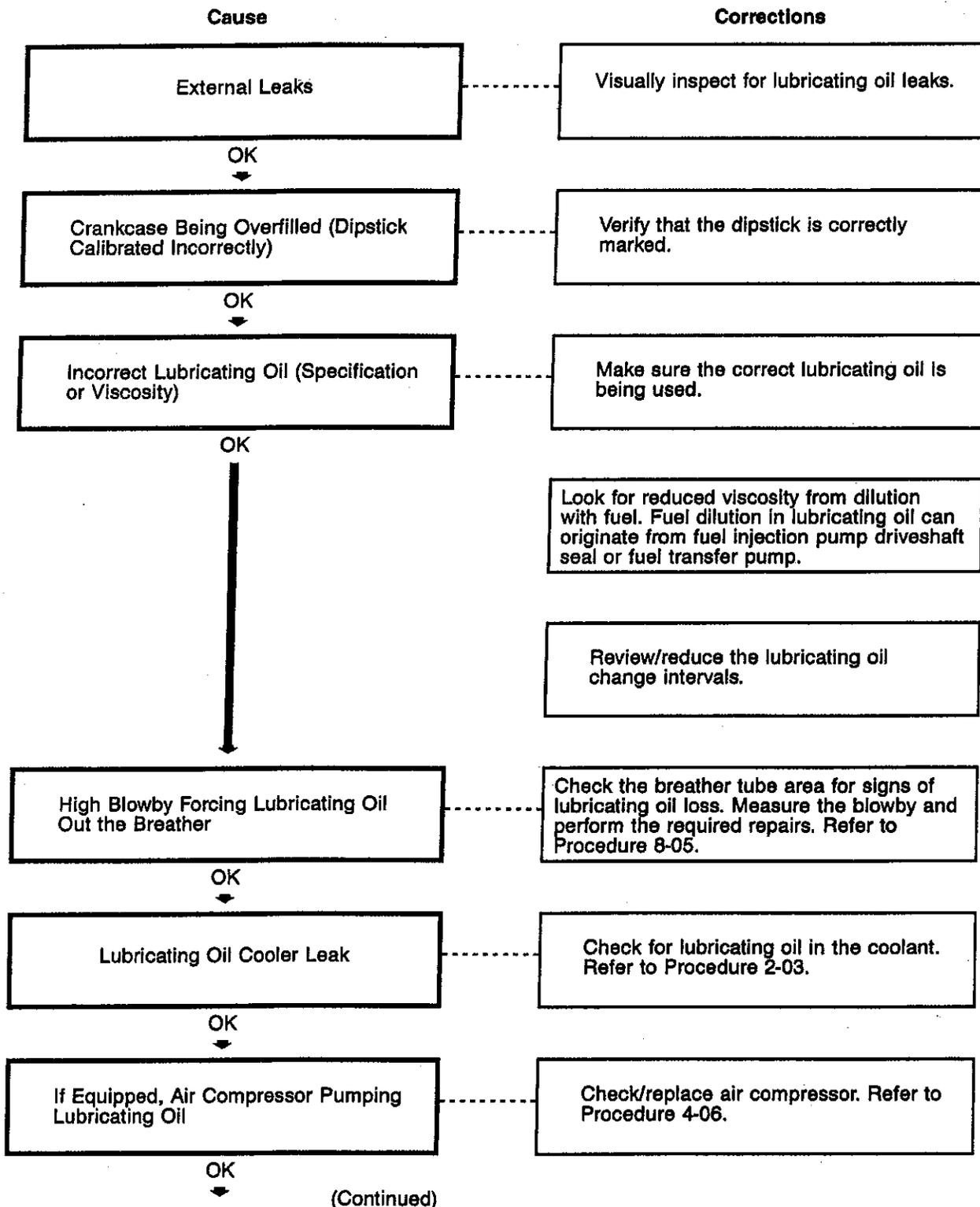
### Lubricating Oil Pressure Low (Continued)



### Lubricating Oil Pressure High

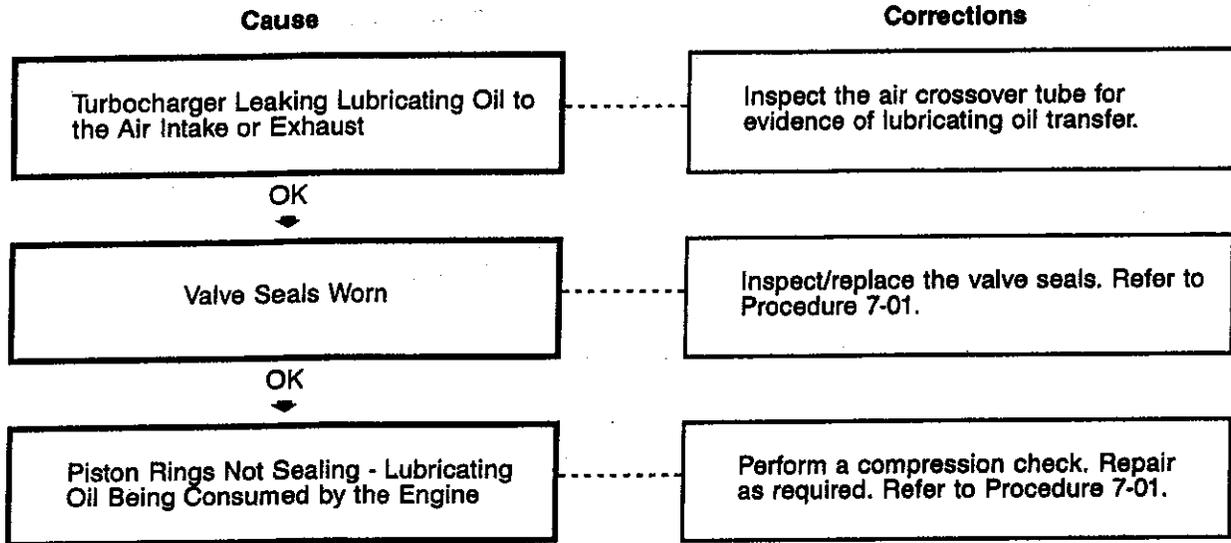


### Lubricating Oil Consumption Excessive

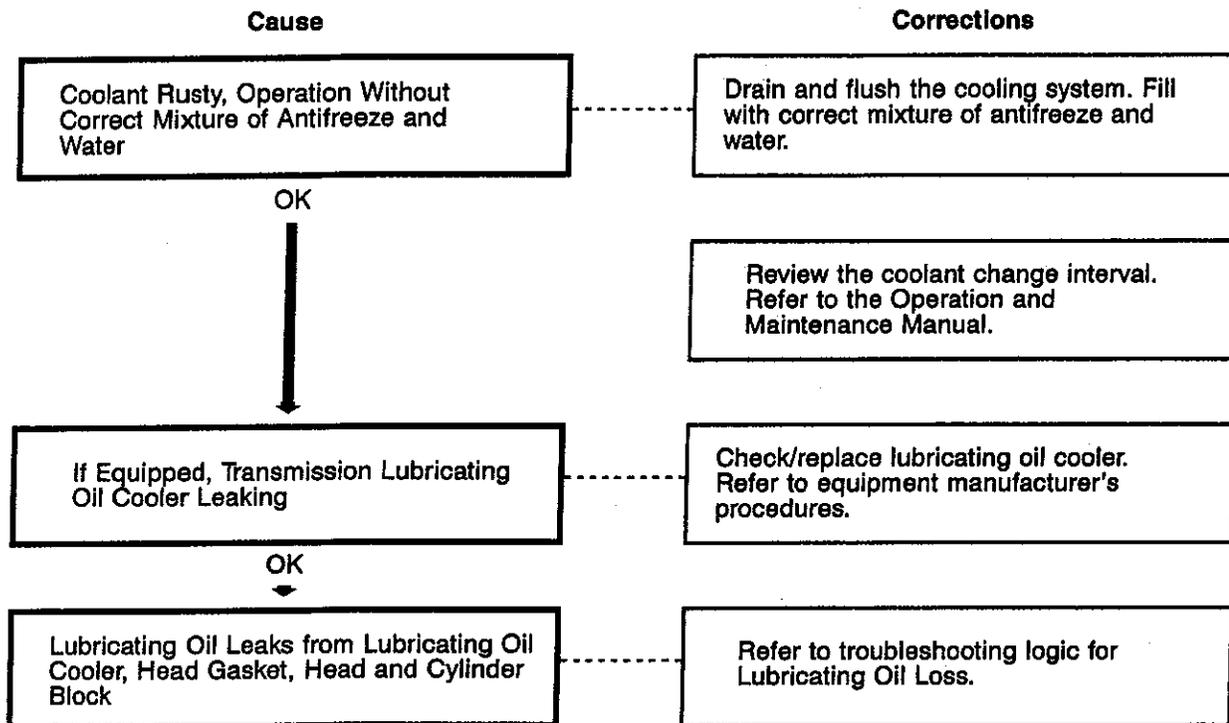


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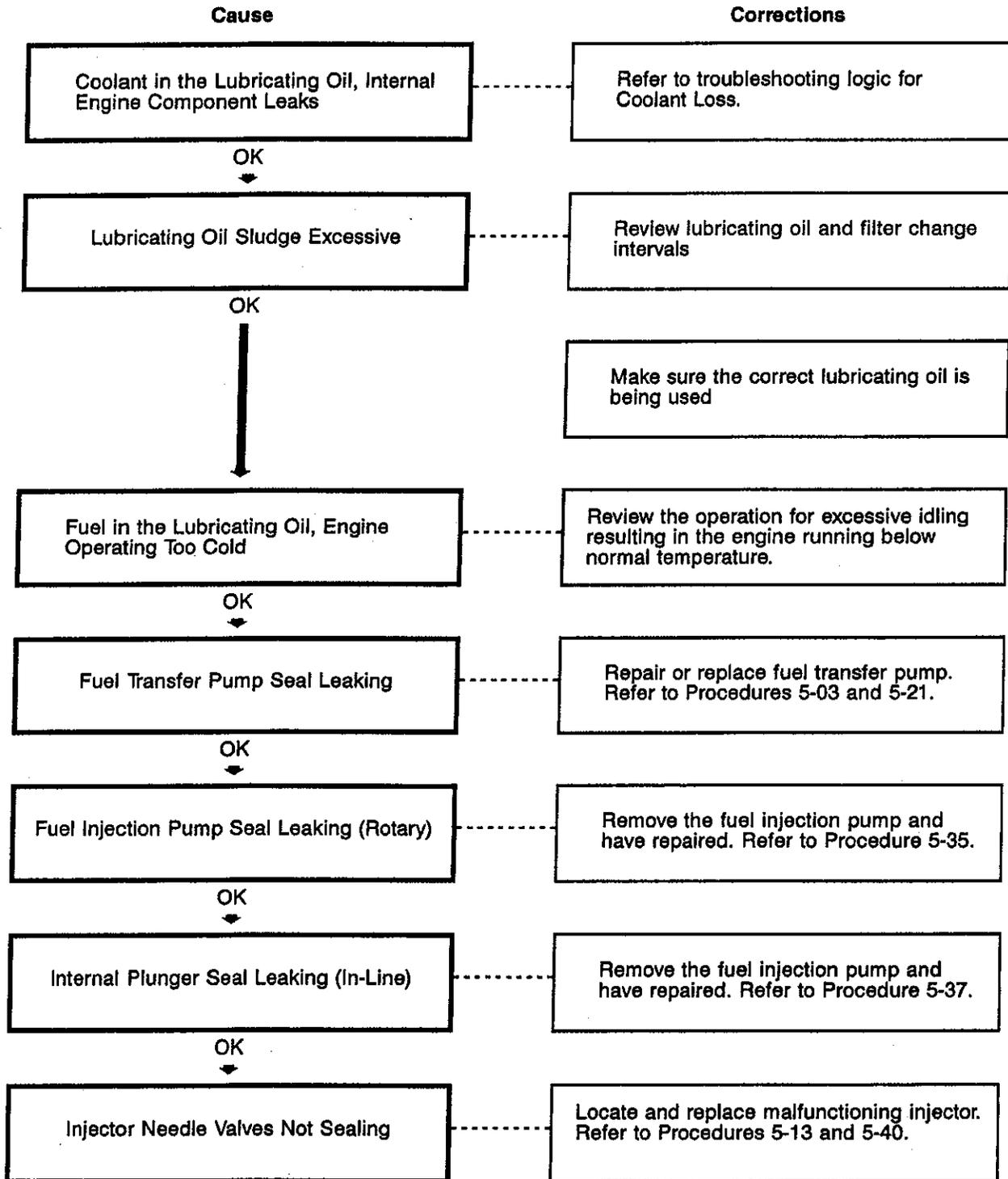
### Lubricating Oil Consumption Excessive (Continued)



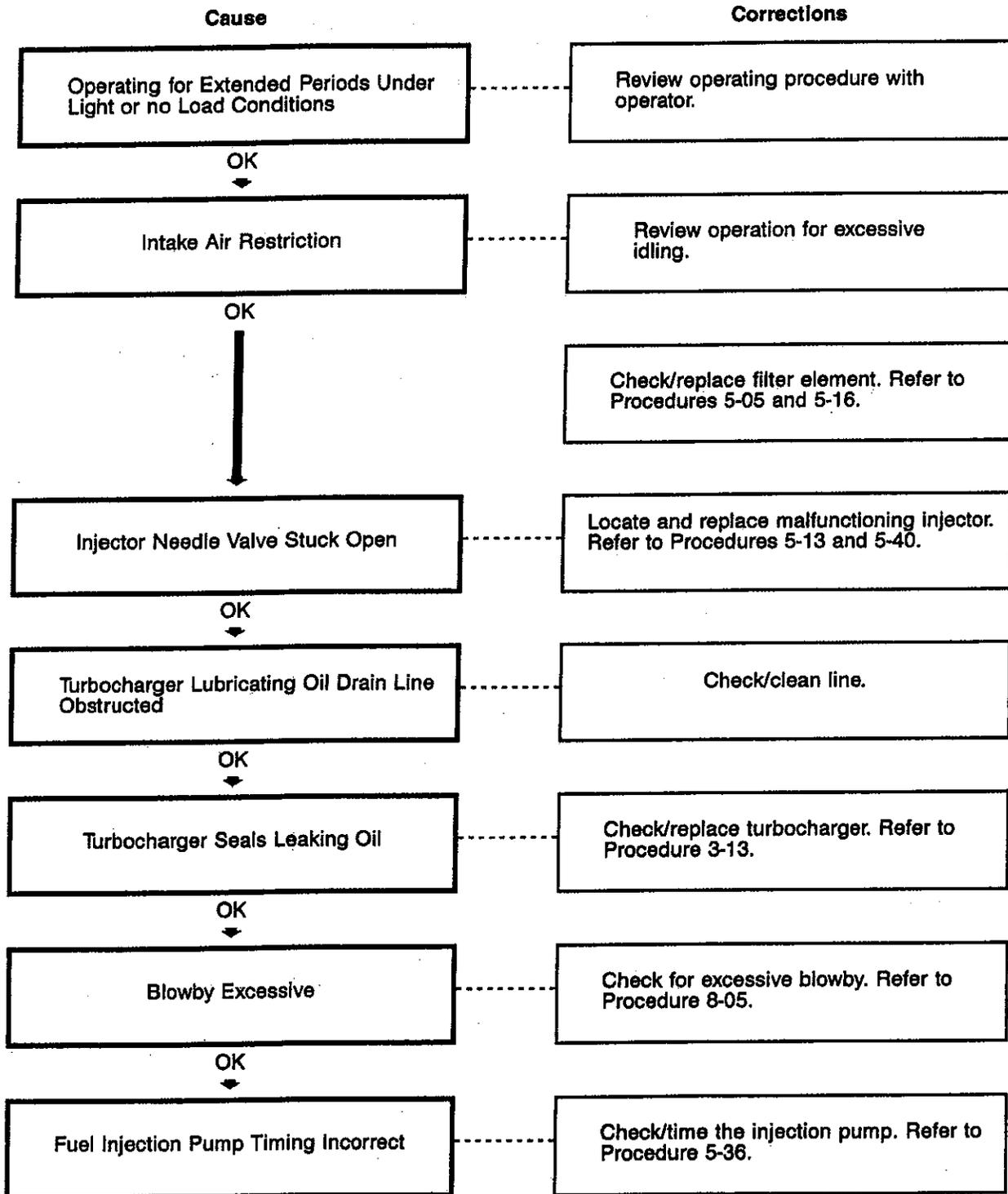
### Coolant Contaminated



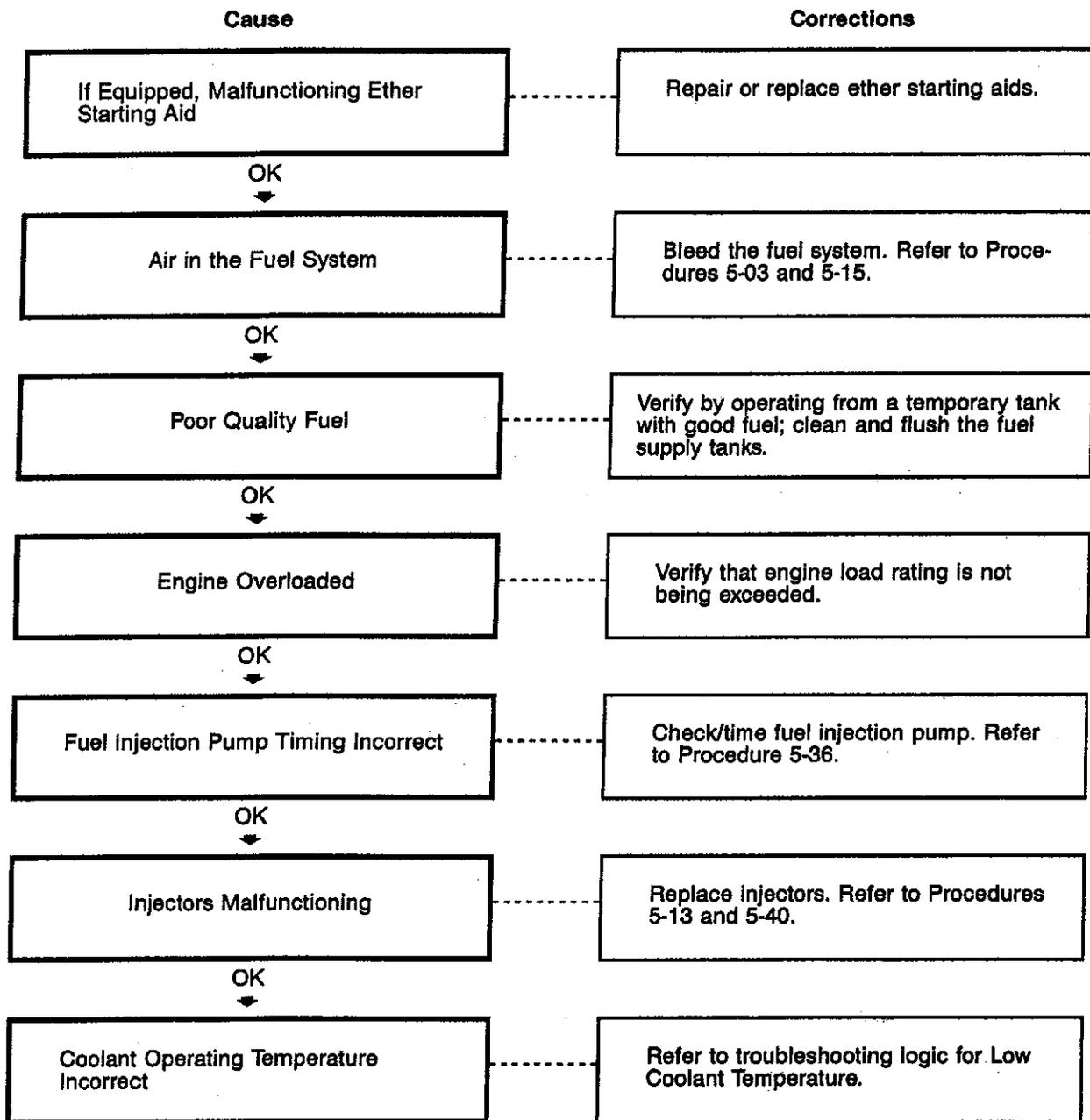
### Lubricating Oil Contaminated



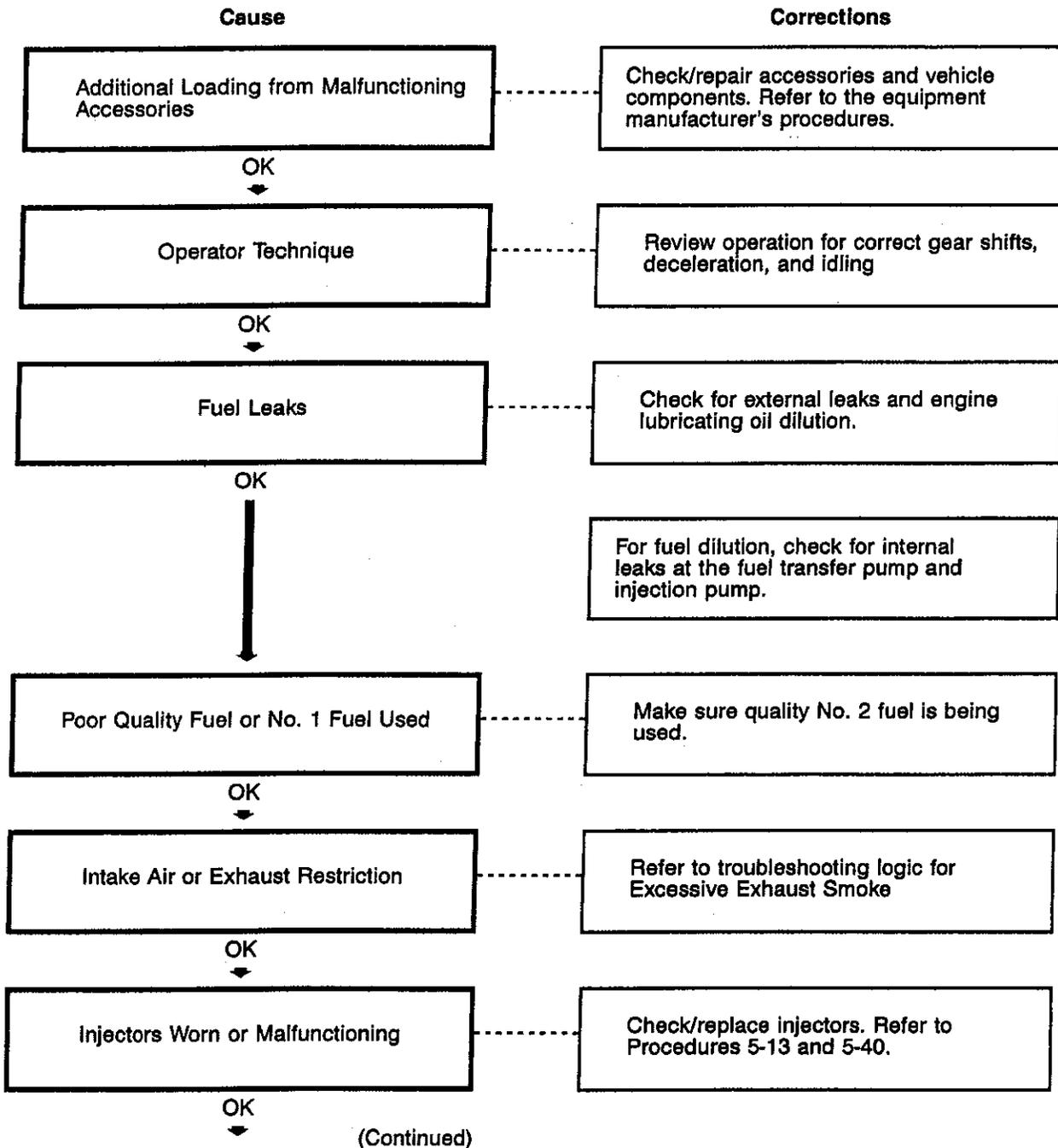
### Fuel Or Oil Leaking From Exhaust Manifold



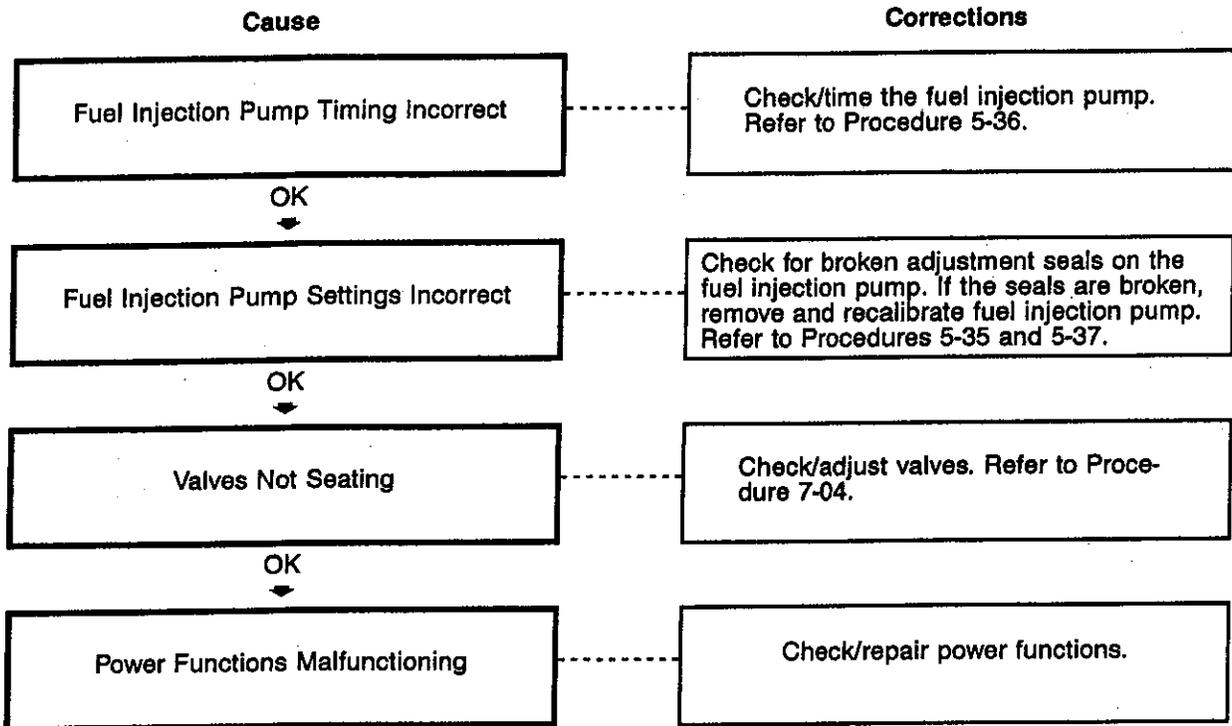
### Compression Knocks



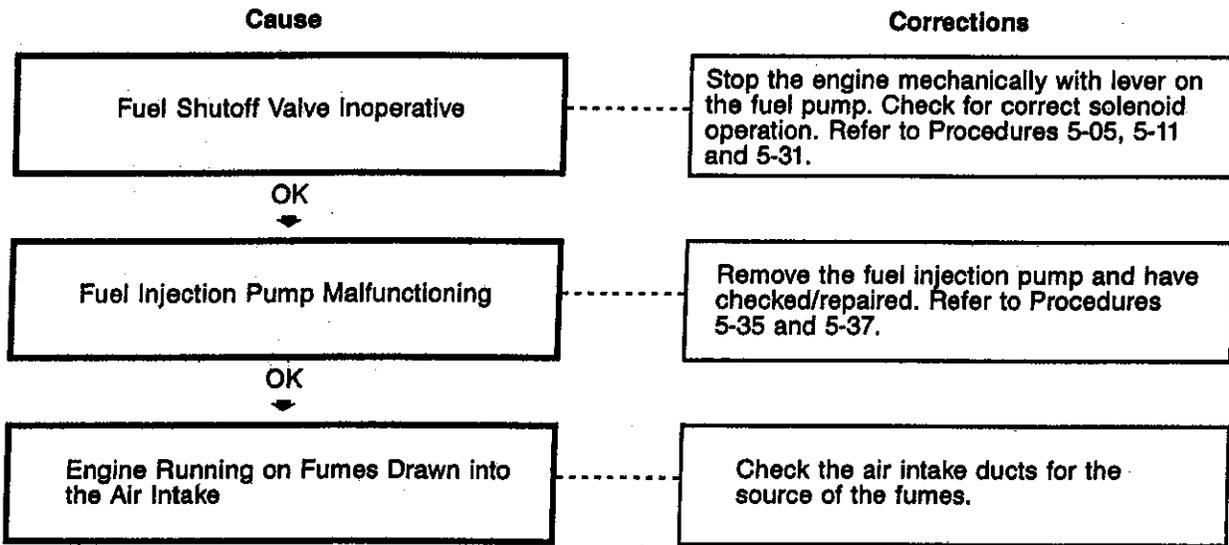
### Fuel Consumption Excessive



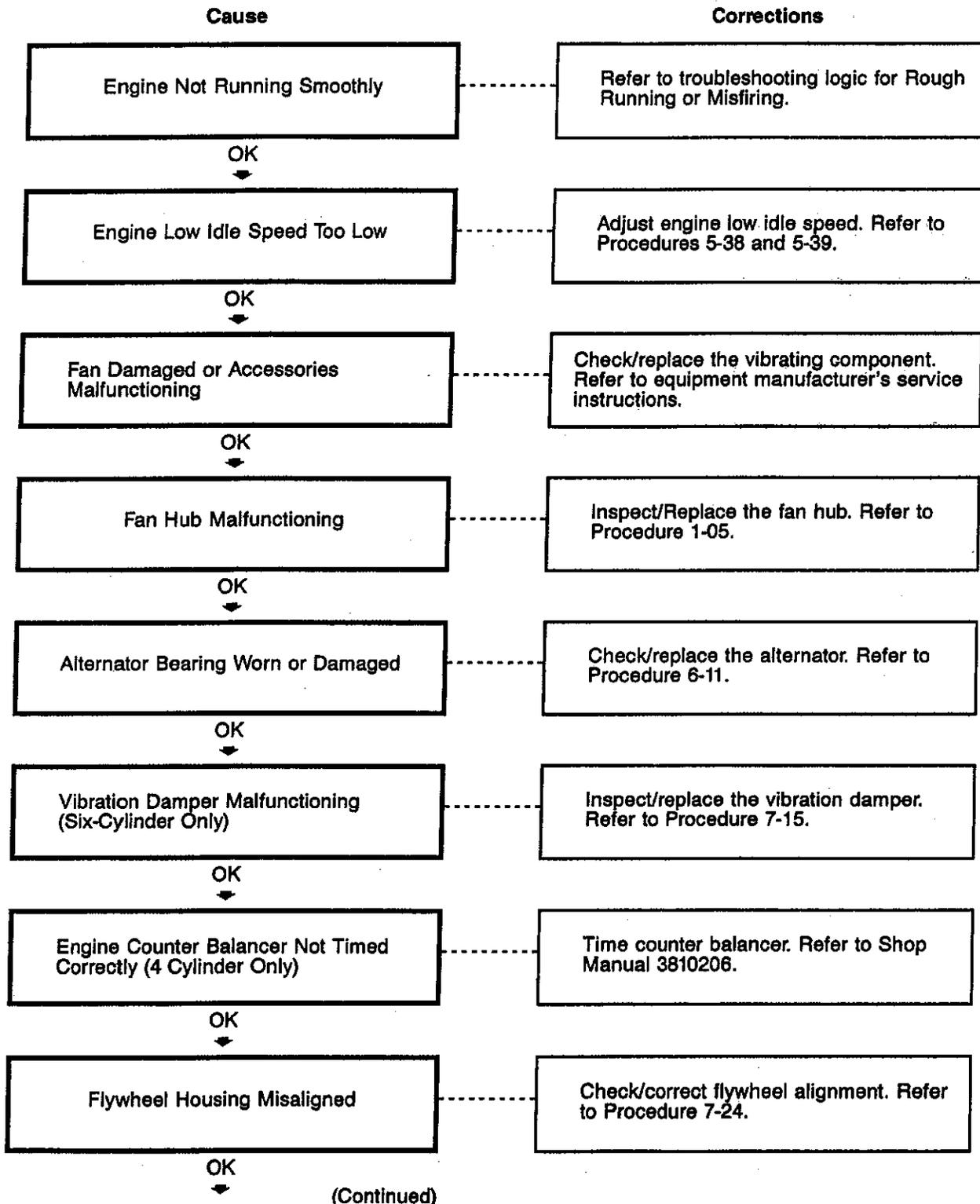
### Fuel Consumption Excessive (Continued)



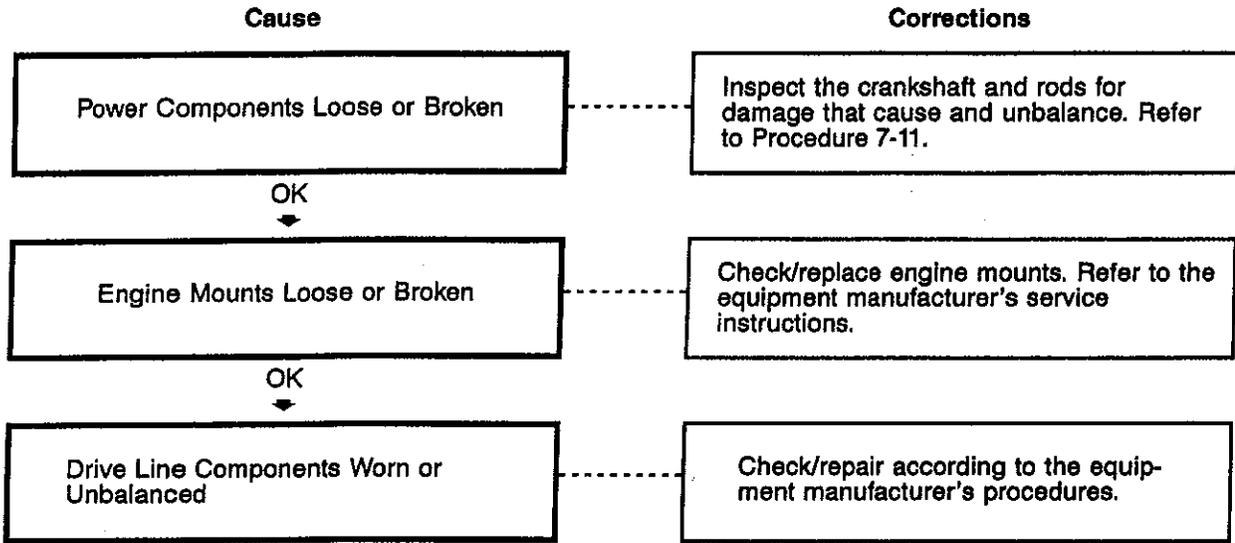
### Engine Will Not Shut Off



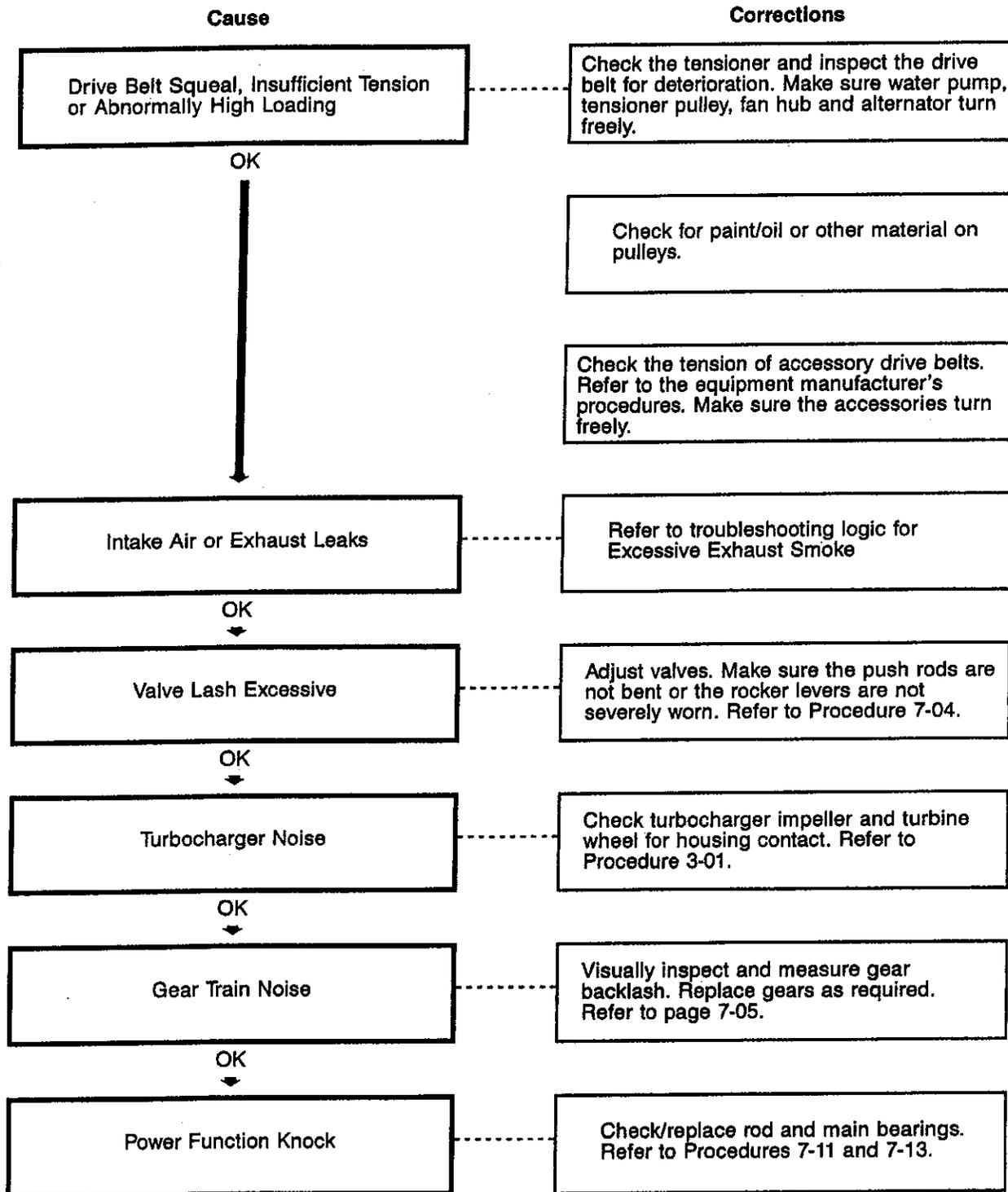
### Engine Vibration Excessive



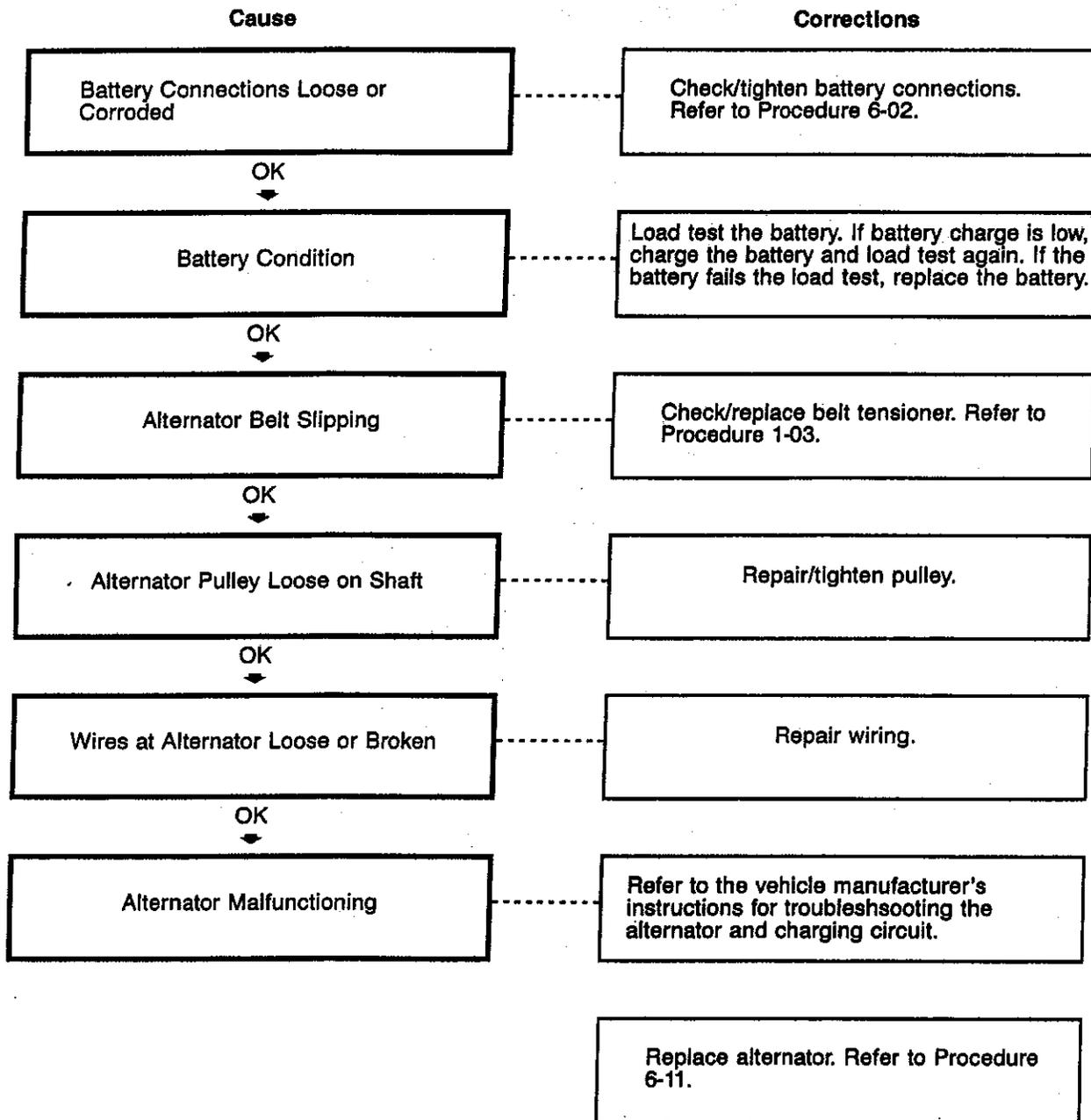
### Engine Vibration Excessive (Continued)



### Engine Noises Excessive

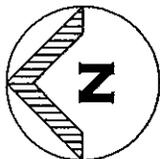
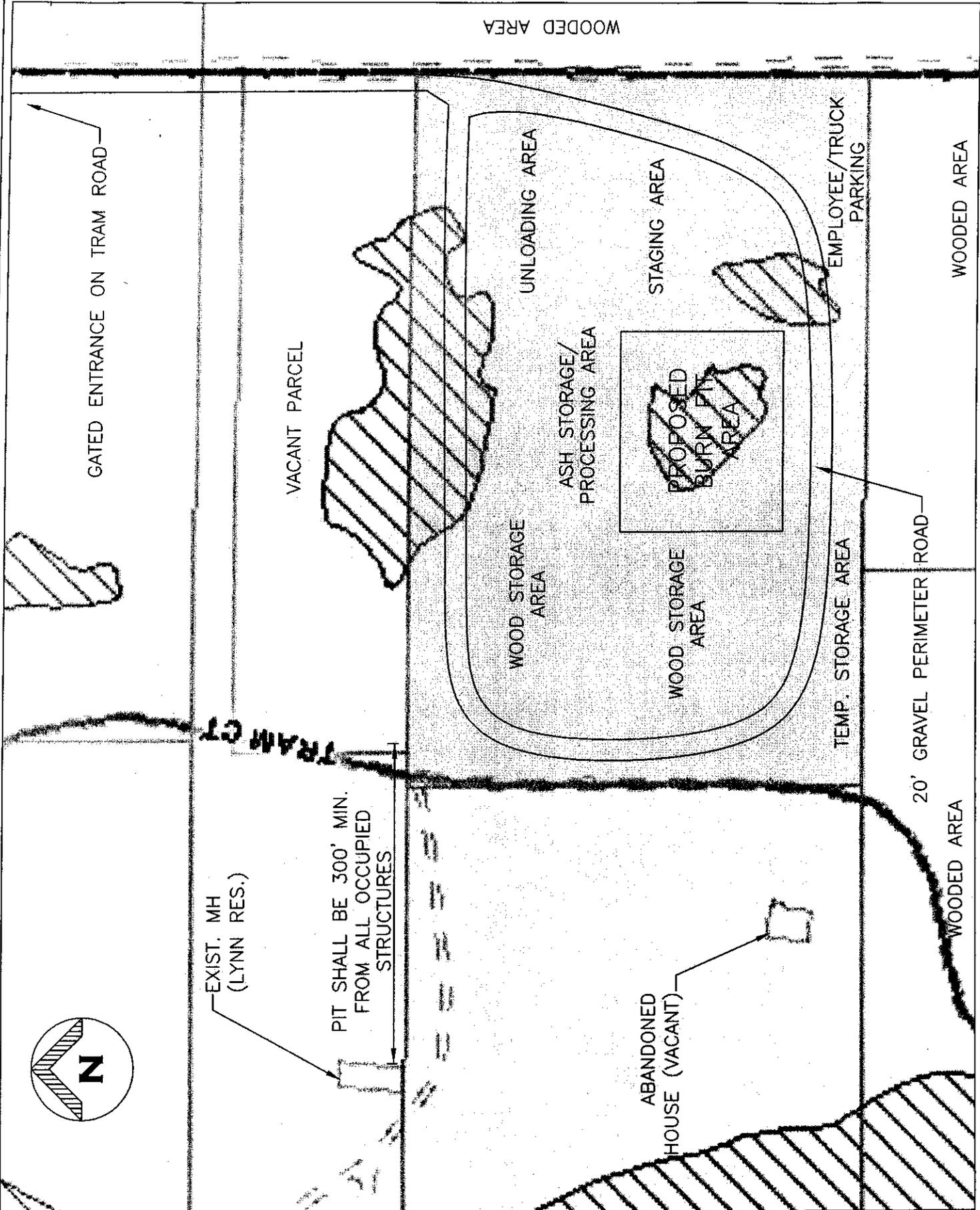


### Alternator Not Charging Or Insufficient Charging



**APPENDIX D**

**FACILITY SITE PLAN**



EXIST. MH  
(LYNN RES.)

PIT SHALL BE 300' MIN.  
FROM ALL OCCUPIED  
STRUCTURES

ABANDONED  
HOUSE (VACANT)

FIGURE NO. 1.0  
 CARMEN BOURGEOIS GREEN, P.E.  
 FLA LICENSE #40890  
 BLACKHAWK ENGINEERING, INC.  
 STATE CERTIFICATE # 26881  
 CARMEN@BLACKHAWKENGINEERS.COM

**BARBER YARD TRASH FACILITY**

SITE PLAN SCALE: 1" = 120'

DESIGNED BY:	C.B.G.	REVISED BY:	DATE:	DESCRIPTION:
DRAWN BY:	C.B.G.			
CHECKED BY:	C.B.G.			
DATE:	3/3/09			



**BLACKHAWK ENGINEERING INC.**  
 9013 MAHAN DRIVE, SUITE 101, TALLAHASSEE FLORIDA 32309  
 PHONE (850) 224-4295 + (850) 222-7645 + FAX (850) 386-4295  
 EMAIL: SUPPORT@BLACKHAWKENGINEERS.COM + STATE CERTIFICATE # 26881

## **APPENDIX E**

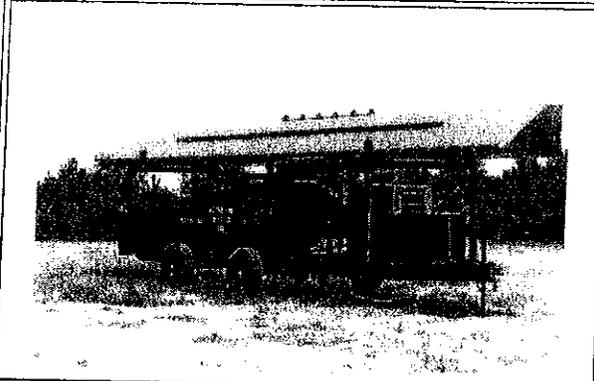
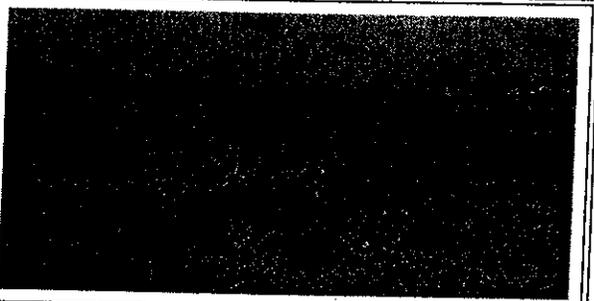
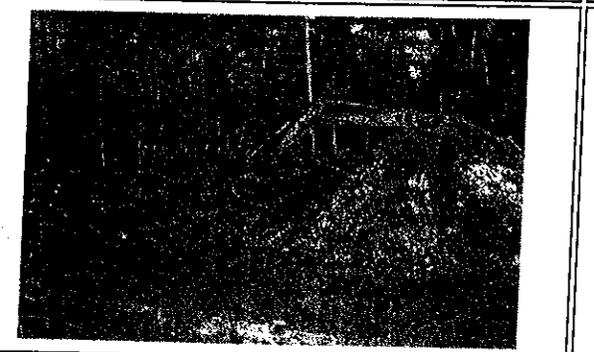
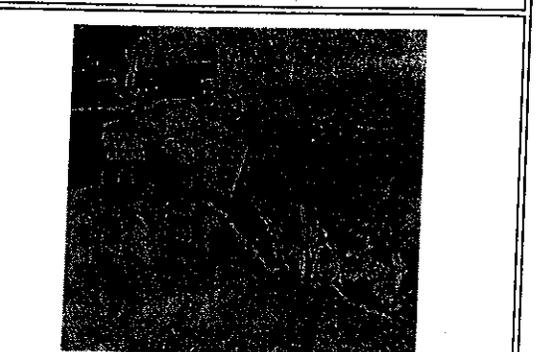
### **MANUFACTURER'S OPERATION INSTRUCTIONS**

# McPherson Systems, Inc

M30F and M40F Trench Burners

Contact us for availability of rental trench burners!

*Please Click the Thumbnail to get a bigger picture.*

	
	
	
<a href="#">M30F Specifications</a>	<a href="#">M40F Specifications.</a>
<a href="#">M30F Setup Diagram</a>	<a href="#">M30F Transport Diagram</a>

[previous page](#)

## ***McPherson Systems Inc.***

100 Springhill Church Road

Tifton, Georgia 31794

(229) 386-2367

### **Specifications for M40F Air Curtain Destructor**

#### **A. Blower Unit**

Diesel power, 152 H.P. Cummins 6BT 5.9L with 1 1/2" PTO clutch.

Vane Axial Fan - 37 inch, 8 blade steel, computer balanced

Volume - 40,000 cubic ft. per minute at atmospheric pressure

Fan Housing - 11 gage double steel for noise suppression and safety

Air volume minimum of 36,000 ft.<sup>3</sup>/min. at nozzle.

Plenum section - 12 gage steel construction with self sealing fireproof connection to the nozzle

#### **B. Nozzle**

Nozzle section - 11 gage steel with no bolt-together sections with reinforcement at air outlets. Nozzle attaches to plenum using a patented quick hitch system.

Nozzle velocity - 8,000 ft./min. - minimum

#### **C. Setup and Transport**

Air curtain is completely portable and can be set up for transport or use in 15 minutes.

#### **D. Warranty**

Warranty - The machine in total is warranted for a period of one year for defects in parts or workmanship. Non warranty items are belts, tires, or damage from misuse or abuse of the machine.

The engine is warranted by the supplier for two year or 2000 hours.

Cummins engines are offered with an optional warranty of up to sixty months. Prices available upon request.

# Air Curtain Destructor Operating Instructions

## Step 1 – Ignition Process

Load the pit 1/3 full with a homogeneous mixture of trees, logs, and large brush. Douse the wood with **1 PINT** of fuel oil, putting the majority of the oil on the wood at the front center side of the pit. Ignite the wood at the same point. Allow sufficient time for the fire to take hold before introducing any air from the Air Curtain Destructor Turn on Air Curtain Destructor fan using following instructions after fire has ignited across pit.

**Caution: DO NOT** use highly volatile solvents such as mineral spirits, gasoline, etc. for ignition.

**NOTE:** Only wood waste consisting of trees, logs, large brush, stumps relatively free of soil, and lumber may be burned.

**CAUTION: AN OPERATOR MUST REMAIN WITH THE MACHINE AT ALL TIMES!**

## Engine Start-Up Procedure

1. Disengage the clutch lever as shown in FIGURE 1.
2. Push in murphy switch and hold.
3. Using the ignition switch, start the engine.
4. Release murphy switch after the oil pressure level has risen to proper operating level.
5. Engage clutch as shown in FIGURE 1.
6. Using the throttle adjustment knob increase engine speed to 2000 RPM.

## Engine Shut-Down Procedure

1. Disengage Clutch lever.
2. Reduce engine speed to 800 RPM.
3. Maintain 800 RPM for several minutes to allow engine to cool.
4. Switch ignition key to **OFF** position.

## **Operating Instructions (cont.)**

### **STEP 2 – Loading Procedures**

Once the fire reaches full intensity intermittent loading may begin. The intervals between loading may be determined by observing the burning rate. The charges should be alternated between light and heavy material. Also, the material should be loaded toward the rear of the pit under the ACD manifold.

The pit should not be overloaded, that is, the material should not be piled up so high that it will protrude above the air curtain. Loading several smaller loads instead of one large load when charging will enhance burner performance. Burning times shall be regulated by state air quality rules as explained in the permit requirements.

When starting up the fire in the morning, you need only to turn on the blower at low speed and begin lightly loading dry wood. Enough hot coals will remain to start the fire each morning if the pit was not covered the day before.

### **STEP 3 – Shut Down Procedures**

Stop loading material into the pit approximately 2 hours before you turn the blower off using the Engine Shut Down Procedure described above.

## Operating Instructions (cont.)

### **STEP 4 – Maintenance & Safety Requirements (See also Service instructions on previous page)**

Ash removal is required in order to maintain efficient and proper combustion. Ashes should not be allowed to build up in the pit to higher than 1/3 the pit depth or to the point where they begin to impede combustion and are blown out of the pit, whichever occurs first. Before ashes are removed they should be saturated with water for cooling and dust control.

For reasons of public Safety, it is recommended that a fence or barrier surround the combustion pit.

The machine should be serviced daily at fan bearings.

To quit burning at the end of the day, loading should be discontinued one to one and half-hours before the blower is shut off.

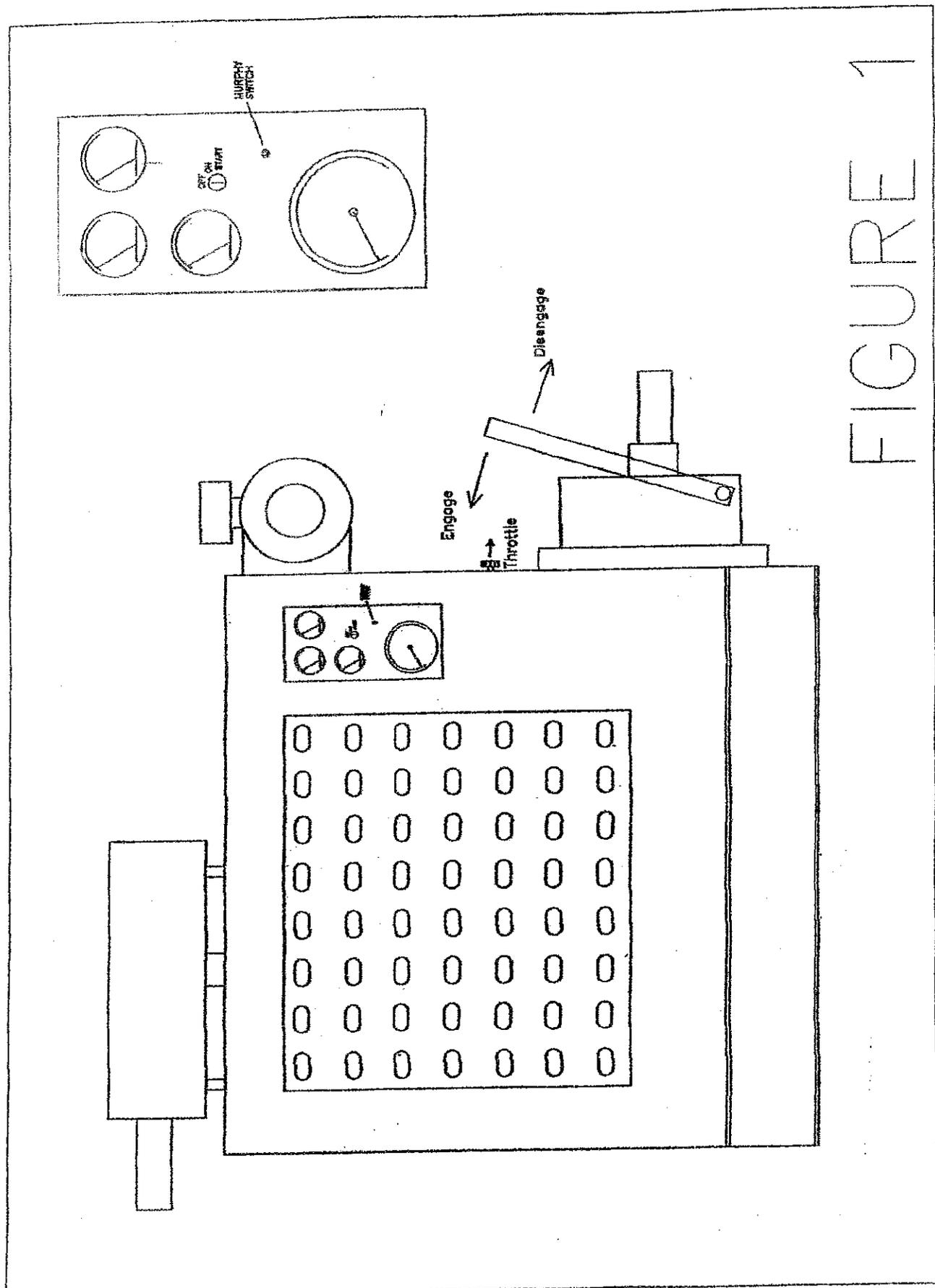
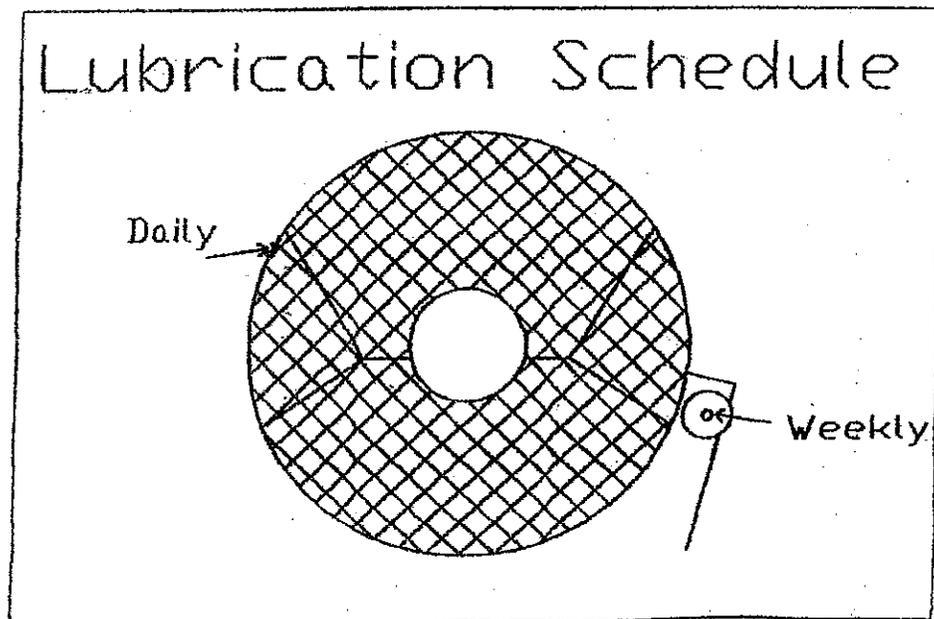


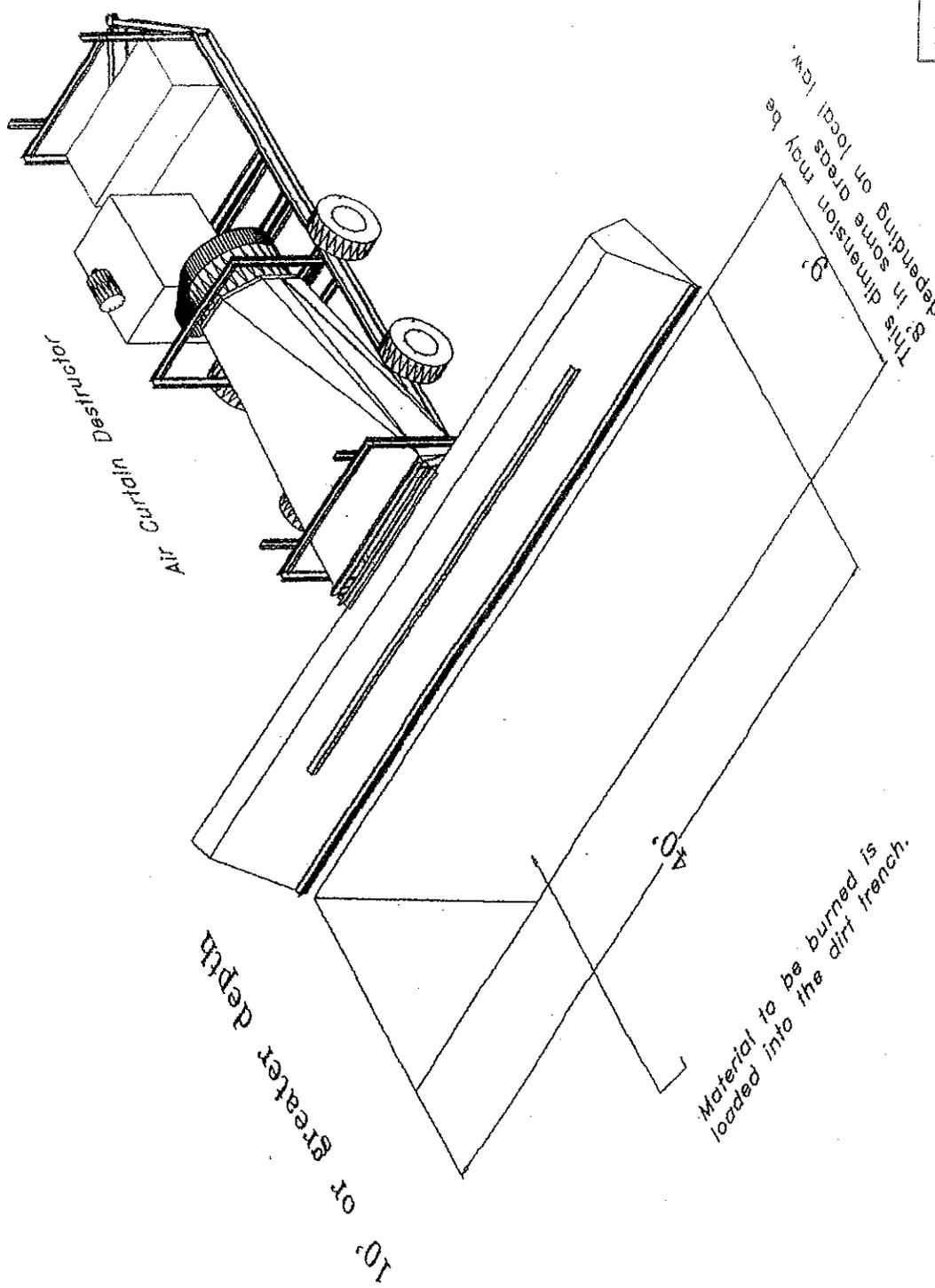
FIGURE 1

## Air Curtain Service Instructions

Note: Always allow engine to cool before performing any service operations

1. Check engine motor oil level.
2. Check radiator water level. **WARNING: NEVER CHECK HOT!**
3. Examine all belts for wear and tension.
4. Inspect fan for cracks or abnormal wear. This can be carried out with a flashlight.
5. Grease engine clutch, belt tensioner, and fan as shown in the following drawings.





McPherson Systems Inc.  
 Tifton, GA  
 (229) 386-2367  
 M40F Set-up diagram