Number: **145-76-1004**
Date: June 28, 2004

ATA System: 76 – Engine Controls

SUBJECT: Engine Ground Operations and Shutdown Procedures

This Service Bulletin is issued for the purpose of providing information to Boeing customers. It is not the authority for CH-47 Chinook units to take any action. Chinook units should receive instructions or guidance from the appropriate government authority to perform this Service Bulletin.

1. PLANNING INFORMATION

A. Effectivity:

(1) Aircraft

Model	Customer	Mfg. Serial No.
MH-47E	US Army	M3701 – M3725, M3258
HCMk3	RAF:	M4476 – M4483
HCMk2/2A	RAF	M4451 – M4458, M7001 – M7032, M4459
CH47SD	ROCA	M4141 – M4149
CH47SD	RSAF	M4131 – M4140
CH47D	HA	M4281 – M4287
CH47D	RNLAF	M3661 – M3667, M4101 – M4106
CH-47F	US Army	M8001 – M8002
MH/CH-47D	US Army	All aircraft with ECP-D218 incorporated

This Service Bulletin is effective for all aircraft with Full Authority Digital Engine Control (FADEC) equipped engines.

(2) Spares Affected

None

B. Concurrent Requirements

None

C. Reason

Engine Over Temperature During Shutdown: Boeing was notified of an incident on an aircraft where an engine experienced a PTIT over temperature during a normal shutdown in FADEC Primary mode, resulting in hot end damage. It was also reported that at least one other similar damaging hot shut down incident has occurred in the past two years. In the most recent incident, an "FB" fault was displayed on the DECU Hex display (when viewed after the event). It is suspected that an “FB” fault was associated with the earlier incident.

Goodrich Pump and Engine Controls Systems (GPECS) and Honeywell Engines have reviewed the incident reports and have concluded that the “FB” fault caused the Reversionary system to “fail fixed” and inhibited complete fuel shutoff operation during shutdown while in

Primary mode. With an “FB” fault, after the ECLs were moved to STOP, 40 lbs/hr of fuel leaked pass the partially open Hydromechanical Assembly (HMA) fuel shutoff valve into the engine. A fuel flow of 40 lbs/hr may be sufficient to re-light a hot engine. Without the assistance of the starter, the engine may self-sustain at a very low RPM resulting in an over temperature condition. The following five DECU “soft” faults will result in this Reversionary failure condition.

FAULT CODE	DESCRIPTION
BC	400 Hz Excitation Fault registered in both Primary and Reversionary.
DB	Reversionary System fault
DE	400 Hz excitation fault seen in Primary or Reversionary
FB	Reversionary Step count fault
B6	Primary or Reversionary Resolver Soft Fault

D. Description

This Service Bulletin provides guidance to minimize the potential to exceed engine/aircraft limits on Chinook aircraft with FADEC equipped engines. This Service Bulletin will affect the procedures used for ground operation reversionary system checks and engine shutdown. Transfer of control from a healthy Primary to a hard-faulted Reversionary may result in an unexpected increase/decrease in engine power. This engine response depends on the difference between positions of the frozen Reversionary Stepper Motor and the active Primary stepper motor. If reversionary mode is selected when an FB fault has already occurred, the engine will transition to the failed fix fuel flow state corresponding to the last commanded reversionary stepper motor position. Therefore, selecting from primary to a hard faulted/failed fix reversionary can result in an increase or decrease in engine power

Summary: **1.** This Reversionary failure condition can result in an un-commanded engine response. A change to the ground operating procedures is required to minimize the potential for exceeding aircraft limits.

2. This Reversionary failure condition can result in an engine over temperature conditions that may damage the engine. A change to the shutdown procedures is required to minimize the potential for this damage.

E. Compliance

Record changes in applicable aircrew manuals within 14 days of receipt of this Service Bulletin**.**

F. Approval

N/A

G. Log Book Entry

None.

H. Manpower

The table below shows an estimate of the man-hours necessary to do this service bulletin for each aircraft. This estimate is for labor only, done by an experienced crew. The estimate does not include lost time. These are some examples of lost time:

- Time to adjust the workplace
- Time to schedule the work
- Time to examine the work
- Time to find the tools
- Time to cure the materials

Skill	Number of Persons	man-hours
Pilots	2	.2
Flight Engineer	1	.1
TOTAL FOR EACH AIRCRAFT		**.3**

I. Weight and Balance Changes

Change in Weight (Pounds)	Change in Moment (Pound-Inches)
N/A	N/A

J. Reference Material

(1) CH-47/OM Operators Manual
(2) CH-47/MTFM Maintenance Test Flight Manual
(3) CH-47/-CL Operators and Crewmembers Check List
(4) CH-47SD/-10 Operators Manual
(5) CH-47SD/-CL Operators and Crewmembers Check List
(6) CH-47SD/MTF Maintenance Test Flight Manual
(7) CH-47/-10 Operators Manual
(8) CH-47/-CL Operators and Crewmembers Check List
(9) CH-47/-MTF Maintenance Test Flight Manual
(10) TM 1-1520-252-10 Operators Manual
(11) TM 1-1520-252-CL Operators and Crewmembers Check List
(12) TM 1-1520-252-MTF Maintenance Test Flight Manual
(13) ICH-47D-10 Operators Manual
(14) ICH-47D-CL Operators and Crewmembers Check List
(15) ICH-47D-MTF Maintenance Test Flight Manual
(16) AP 101C-0502-15 Operators Manual
(17) AP-101C-0502-14 Maintenance Test Flight Manual
(18) AP-101C-0502-5M Flight Test Schedule
(19) AP-101C-0503-15 Operators Manual
(20) AP-101C-0503-14 Maintenance Test Flight Manual
(21) AP-101C-0503-5M Flight Test Schedule
(22) TM 1 1520-XXX-10 Operators Manual
(23) TM 1 1520-XXX-CL Operators and Crewmembers Check List
(24) TM 1 1520-XXX-MTF Maintenance Test Flight Manual

K. Other Publications Affected

(1) CH-47/OM Operators Manual
(2) CH-47/MTFM Maintenance Test Flight Manual
(3) CH-47/-CL Operators and Crewmembers Check List
(4) CH-47SD/-10 Operators Manual
(5) CH-47SD/-CL Operators and Crewmembers Check List
(6) CH-47SD/MTF Maintenance Test Flight Manual
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(20) AP-101C-0503-14 Maintenance Test Flight Manual
(21) AP-101C-0503-5M Flight Test Schedule
(22) TM 1 1520-XXX-10 Operators Manual
(23) TM 1 1520-XXX-CL Operators and Crewmembers Check List
(24) TM 1 1520-XXX-MTF Maintenance Test Flight Manual

Pending revision of affected publications, technical requirements in this bulletin shall be used for interim support.

2. MATERIAL INFORMATION

A. Material Required per Aircraft

None

Material to be purchased locally:

Material supplied with service bulletin:

None

B. Parts Required to Modify Spares

Material to be purchased locally:

None

Material supplied with service bulletin:

None

C. Existing Parts Accountability

None

D. Special Tools and Equipment Required

No Special tools or equipment are necessary to do the change in this service bulletin.

3. ACCOMPLISHMENT INSTRUCTIONS

GENERAL NOTES

1. Obey all of the warnings and cautions given in the specified manuals.

WORK INSTRUCTIONS

A. Instructions:

(1) Ground Operation Reversionary System Checks:

(a) Revise the Ground Operation procedure in aircrew manuals to add the following caution when performing Reversionary checks:

CAUTION: MONITOR ROTOR RPM AND ENGINE PARAMETERS. IF AN UNEXPECTED RESPONSE OCCURS, IMMEDIATELY SELECT PRI, EXECUTE AN ENGINE SHUTDOWN, AND TROUBLESHOOT.

(2) Engine Over Temperature During Shutdown

CHANGE ENGINE SHUTDOWN PROCEDURE TO:

(a) ENG COND levers — GND.
(b) DECU display — Check for 88.

CAUTION: IF THE DECU FAULT DISPLAYS ANY OF THE FOLLOWING CODES, SHUT DOWN THE ENGINE USING THE FOLLOWING PROCEDURE:

B6, BC, DB, DE and FB

1. FIRE PULL handle (affected engine) — Pull
2. When engine shuts down, ENG COND lever — STOP
3. Continue with normal shutdown

NOTE: If the DECU fault display is other than "88" refer to maintenance.

(c) ENG COND lever — STOP

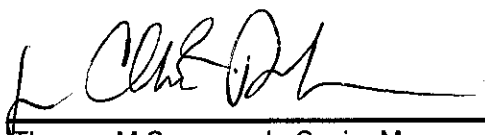

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FIGURE AND ATTACHMENT TABLE OF CONTENTS

There are no figures or attachments included with this Service Bulletin.

Number: **145-76-1004**
Date: June 28, 2004

Evaluation Form

System: 76 -Engine Controls
Prepared By: B Rice

SUBJECT: Engine Ground Operations and Shutdown Procedures

Use this evaluation form to tell us what you think of the quality of this Service Bulletin. We will use the data that you give us to improve the quality of our Service Bulletins.

NOTE: Please do not use this evaluation form to tell us to make changes to your manuals. To make these changes, please use your appropriate publications change form.

Please give us this data:
(If necessary, please use the other side. Thank you for the time you used to give us your comments.)

OPERATOR: _____ TODAY'S DATE: _____

PREPARED BY: _____ TITLE: _____

ORGANIZATION: _____ BASE: _____

TELEPHONE NUMBER: _____ FAX: _____

Please rate the quality of this Service Bulletin: (good) 4 3 2 1 (poor)

Please rate the quality of the illustrations: (good) 4 3 2 1 (poor)

Will you do the change given by this Service Bulletin? Yes_____ No_____ If not, please explain:

Is this Service Bulletin easy to understand? Yes_____ No_____ If not, please explain:

Is this Service Bulletin easy to use? Yes_____ No_____ If not, please explain:

Are the Planning Information, Material Information, and Accomplishment Instructions accurate? Yes_____ No_____ If not, please explain:

Is the Manpower estimate accurate? Yes_____ No_____ If not, please explain:

Give the completed evaluation form to your Boeing Field Service Representative or send the evaluation form directly to this address:

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