

**15 APRIL 2003**

**Maintenance**

**ENGINE MONITORING PROGRAM (EMP)**



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(CMSgt Gerald T. Arens)  
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Certified by: HQ AMC/LGF  
(Col Rebecca J. Garcia)  
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This instruction implements Air Force Policy Directive (AFPD) 21-1, *Managing Aerospace Equipment Maintenance*, and prescribes administrative procedures for monitoring jet engine internal performance. This program applies to Air Mobility Command (AMC) operational C-5; C-9A; C-17; C-32A, C-, EC-, and KC-135; and C-141 units. It applies to United States Air Force Reserve (USAFR) and Air National Guard (ANG) units; it does not apply to the 89th Airlift Wing (except C-32A aircraft) and C-141 aircraft assigned to the 97th Air Mobility Wing. Do not publish supplements to this instruction without prior HQ AMC/LGB approval, then issue according to AFI 37-160, Volume 1, *The Air Force Publications and Forms Management Programs—Developing and Processing Publications* (when published). Submit recommended changes by using AF Form 847, **Recommendation for Change of Publication**, to HQ AMC/LGBCP through AMC channels. Reporting here is exempt from licensing according to AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Inter-agency Air Force Information Collections*, paragraph 2.11.10.

**SUMMARY OF REVISIONS**

This interim change 2003-01 to AMCI 21-107 provides guidance and new procedures for the use of the C-17 aircraft Optical Quick Access Recorder discs and Quick Access Recorder tapes. **A bar ( | ) indicates change from the previous edition.**

**Section A—General**

**1. Purpose.** The EMP includes the Engine Condition Monitoring Program (ECMP), Turbine Engine Monitoring System (TEMS), Quick Access Recorder (QAR), and Malfunction Detection Analysis and Recording System (MADARS) which were developed and implemented and must be used to further the safe operation, performance reliability, and lower maintenance operating costs of installed turbine engines. These engine trending and diagnostic (ET&D) programs will detect developing internal failure of engine gas path parts or shifts in instrumentation calibration or accuracy. When properly administered,

this will be an effective management tool that allows maintenance personnel to take corrective actions before an engine failure or expensive secondary damage occurs. As directed by AFI 21-104, *Selective Management of Selected Gas Turbine Engines*, this data is critical for proper ET&D (Technical Order [TO] 00-25-257), which is critical to the automated Comprehensive Engine Management System (CEMS) IV.

### ***Section B—Responsibilities***

#### **2. Air Mobility Command Headquarters.**

- 2.1. The headquarters will provide overall management and provide an education and training avenue for EMP.
- 2.2. The Directorate of Logistics, Systems and Engineering Division, Systems Maintenance Branch, Propulsion Section (HQ AMC/LGBCP) is designated office of primary responsibility (OPR) for this program and will:
  - 2.2.1. Provide management direction for EMP.
  - 2.2.2. Coordinate all proposed changes to this publication with appropriate AMC staff.
  - 2.2.3. Coordinate between AMC and Air Force Materiel Command (AFMC) agencies on matters concerning EMP.

#### **3. Airlift and Air Refueling Wings.**

- 3.1. The operations group commander will provide aircraft training (in-flight crew responsibilities) under EMP and will enforce compliance with the applicable portion of the publication.
- 3.2. The logistics group commander is responsible for managing EMP in operating units.
  - 3.2.1. May publish local instructions outlining administrative procedures to be used in conjunction with this program.

### ***Section C—Procedures***

**4. General.** All AMC units will follow procedures in this instruction for all flights and all models of AMC aircraft as applicable.

**5. Logistics Group Commander.** Will appoint a senior propulsion supervisor as project manager (non-commissioned officer [NCO], civilian, or Air Reserve technician [ART]) and ensure EMP monitors are identified throughout the unit as necessary.

**6. Engine Monitoring Program Project Manager.** The project manager will:

- 6.1. Manage and coordinate the EMP for the logistics group commander; establish a viable, visible program through continual coordination between operations and maintenance aircraft generation squadron (AGS), sortie generation flight (SGF), aircraft maintenance unit (AMU), and engine management, thus providing a close-loop system for information and maintenance repair actions.
- 6.2. Provide liaison with operations to ensure an understanding of the program. Provide feedback from the EMP to aircrews and the operations staff.

- 6.3. Act as the single point of contact (POC) in each wing for all recommended changes to this instruction.
- 6.4. Be the primary technical advisor on the EMP for the logistics group commander. Perform as primary technical advisor to AGS management if locally directed.
- 6.5. Conduct quarterly review of engine performance worksheets and computer data. The EMP manager, monitor and SGF/ AMU representative will form a review panel as a minimum.
- 6.6. The project manager will maintain engine data and advise logistics on required matters of concern.
- 6.7. Assign/designate a primary and alternate jet engine technician Air Force Specialty Code (AFSC) 2A671A or civilian equivalent, as the logistics support squadron (LSS) EMP monitors. For units with an assigned propulsion element/flight, EMP monitors may be assigned to them. This person must be knowledgeable of engine operation, troubleshooting, and repair procedures. Ensure EMP monitors are formally trained through field training detachment courses as applicable. Expertise in analyzing trend plots can only be gained by on-the-job experience. Collocate LSS EMP monitor with the engine management section. Each assigned SGF/AMU will assign an additional flightline EMP monitor within their unit. Do not rotate EMP monitors unless absolutely necessary. Rotating monitors greatly hamper the reliability and management of the ECMP and TEMS programs, thus degrading engine data.
- 6.8. Ensure the EMP workload, work schedule, and EMP data management and analysis are such that continual evaluation and daily flow of EMP data are assured.
- 6.9. Validate the EMP monitor's recommendations for engine maintenance as a result of ECMP and TEMS trending or analysis, as necessary.
- 6.10. Coordinate with appropriate agencies to resolve problems with the EMP.

## **7. Logistics Support Squadron Engine Monitoring Program Monitors.**

- 7.1. Obtain suitable CEMS IV system host microcomputer and ensure applicable SGF/AMU systems are acquired
- 7.2. Ensure SGF/AMU EMP monitors download aircraft engine monitoring system (EMS) data and enter engine performance data in the EMP computer as soon as possible after each flight (enter oil servicing data in the CEMS IV computer for C-, EC-, and KC-135 aircraft). C-5 units use MADARS tape flight data set numbers.
- 7.3. Obtain an in-flight data sheet (IFDS) from SGF/AMU monitors, maintenance operations, or aircraft scheduling as required when KC-135R/T TEMS is inoperative. Forward major and minor cycles count to LSS engine manager for proper reporting. For KC-135R aircraft, forward aircraft flight duration as recorded on IFDS to engine manager for processing in CEMS Telecommunications Service Order (TSO) A155 to calculate cycles until TEMS is operational. As a last resort if CEMS is unavailable, use the formula of one major and four minor cycles per 4-hour average flight and input into CEMS IV. CEMS is the primary system for hours/cycles storage. TEMS is the source from which to update G081 engine flight hours.
- 7.4. Record applicable engine and engine instrument maintenance in the CEMS IV computer or on AMC Form 330, **Engine Maintenance Summary**, as applicable for analysis of engine condition

against the trend plot. C-5 units use 9035/8050 program. Access all TF39 information through interactive system productivity facility (ISPF) or GO81 as appropriate.

7.5. Coordinate with the SGF/AMU monitor to diagnose and analyze engine trends from the performance evaluation graph and maintenance summary to determine if each engine:

7.5.1. Is operating satisfactorily.

7.5.2. Shows a substantial and progressive increase or decrease from the base conditions. Initiate maintenance action request if a corrective action is suspect or a discrepancy cannot be found. The engine should be designated as a "watch" engine.

7.5.2.1. An engine validated as a "watch" engine will have the computer graph flagged. For C-/EC-/KC-135 aircraft, entry will be made in Air Force Technical Order (AFTO) Form 781A, **Maintenance Discrepancy and Work Document**, on a red dash. Each entry will begin: "Engine position \_\_\_ on EMP watch status." Also, enter the reason for "watch" status in sufficient detail to explain the basis for this action. The AFTO Form 781A entries will be amended after each review and action taken noted in the "corrective action" block. If an engine is continued in "watch" status, a new entry will be made and begin: "Engine position \_\_\_\_\_ continued on watch status." Enter reason in sufficient detail to explain basis for this action. "Watch" engine discrepancies will not be transferred to AFTO Form 781K, **Aerospace Vehicle Inspection, Engine Data, Calendar Inspection and Delayed Discrepancy Document**.

7.5.2.2. Ensure corrective actions on "watch" or EMP problem engines are accomplished as soon as possible.

7.6. When the engine trend plot indicates maintenance or engine removal is required, coordinate with the project NCO and maintenance operations or AMU scheduling to assure the appropriate work orders are provided and scheduled as soon as practical.

7.6.1. Establish coordination procedures with SGF/AMU monitors for ET&D maintenance actions.

7.6.2. LSS EMP monitor will have final authority/responsibility for all ET&D maintenance actions.

7.7. Monitor EMP actions and ensure the wing mission is not hampered by delays due to lack of coordination within maintenance areas.

7.8. Submit aircraft engine instrument maintenance and check-out requests through maintenance operations and aircraft scheduling.

7.9. For C-, EC-, and KC-135 aircraft, provide a copy of the aircraft ECMP and/or CEMS IV ET&D disk to the scheduling and documentation section on aircraft scheduled to deploy to an automated EMP base for over 96 hours. For C-5 aircraft, prepare/update a weekly cycle/hourly component list, using batch file F67184 "time change item forecast" program.

7.10. For permanent change of station (PCS) out aircraft, provide ET&D disk as per paragraph 7.9. and maintain EMP data on hard disk until confirmation has been received from the gaining unit that data has been successfully transferred. Units receiving PCS or returning temporary duty (TDY) aircraft; within 10 days of aircraft receipt, LSS EMP monitor will notify losing LSS EMP monitor that ET&D data was successfully received.

## 8. Sortie Generation Flight, Aircraft Maintenance Unit.

8.1. Ensure SGF/AMU EMP monitors are identified (paragraph 6.7.), trained, and appropriate EMP computers are obtained (paragraph 7.1.).

8.2. SGF/AMU EMP monitor will download EMS data and process collected data and/or IFDS in the unit EMP computer system as soon as possible after each flight. If automated system is inoperative, enter the engine performance data from the IFDS as soon as possible after each flight. Coordinate with LSS EMP monitor on all ET&D maintenance actions.

8.3. Provides maintenance actions in response to EMP monitor generated work requests.

8.4. SGF/AMU EMP monitor ensures instrument maintenance on aircraft engine's instrumentation system identified by EMP is recorded on the AMC Form 227, **Aircraft Instrument Checkout Data**, and corrective actions are annotated on maintenance summary. Test results, before and after component replacement, must be indicated along with corrective action.

8.5. SGF/AMU EMP monitor ensures oil servicing quantities for C-, EC-, and KC-135 aircraft are input into the EMP CEMS IV computer system.

8.5.1. Ensure engines that are subject to the Oil Analysis Program (OAP) for wear metals identification are evaluated according to TO 33-1-37, engine specific technical orders, and applicable forms are documented according to TO 00-20-5.

8.5.2. Ensure engines utilizing oil system gearbox chip detectors, if chips are discovered, immediately forward chips to the specific engine evaluation center.

8.5.3. For deployed KC-135R aircraft with maintenance personnel, ensure a maintenance technician is trained and qualified to download and store on handheld D/DU or process TEMS/IFDS data onto CEMS IV disk after each flight for transmission to home station.

8.6. For deployed aircraft, units will establish a modem line for transmittal of CEMS IV data or as a minimum, weekly mail CEMS IV data disks with hard copy printouts of time/cycle data and/or IFDS to home station.

8.7. SGF/AMU EMP monitor will reconcile daily unit assigned aircraft CEMS IV ET&D data with the LSS EMP host computer.

## 9. Other Requirements For KC-135 Aircraft.

To ensure the effectiveness of the EMP, the following actions are required to close the reporting and EMP evaluation loop.

9.1. The scheduling and documentation section will notify EMP project NCO or EMP monitor when aircraft are scheduled to deploy to an automated EMP base for over 96 hours. This section will ensure CEMS IV records for deploying aircraft are sent to the new operating base by ensuring a copy of the aircraft CEMS IV disk is included in the aircraft record's folder. A copy of DD Form 2027, **Oil Analysis Record**, will be included in aircraft records.

9.1.1. Parent units will ensure aircraft are not deployed to TDY locations with an engine in "watch" status unless operational requirements dictate otherwise.

9.1.2. Automated EMP host bases will:

9.1.2.1. Conduct EMP on all TDY AMC aircraft according to this publication.

9.1.2.2. Maintain the aircraft file for TDY aircraft on the hard disk for 10 days after redeploy-

ment to prevent loss of ECMP and TEMS records or until owning organization confirms successful receipt of ET&D data.

9.1.3. The scheduling and documentation section of the TDY units will ensure ECMP and TEMS records are returned to the parent unit on floppy disk in the aircraft records' folder upon redeployment.

9.1.4. The parent unit EMP monitor will expedite processing in-flight data (IFD) forms or in-flight data messages (see [Attachment 1](#)) received on aircraft away from home station. If a substantial or progressive increase or decrease from the base condition is noted on the engine, the EMP monitor will notify the project NCO and provide analysis or diagnosis for a recommended course of action. The project NCO will notify the owning aircraft squadron commander and contact the TDY unit by telecommunications followed by a priority message concerning the engine status and maintenance action required.

## **10. Maintenance Operations and Sortie Generation Flight/Aircraft Maintenance Unit Scheduling.**

10.1. Coordinate a core automated maintenance system (CAMS)/GO81 maintenance request against the probable engine or related system malfunctions after notification by the EMP project NCO or EMP monitor.

10.2. Schedule maintenance when practical within mission requirements and consistent with the severity of the malfunction.

10.3. Monitor the return of IFD forms by each aircrew to maintenance debriefing. Ensure all IFD forms are returned to EMP monitor. For KC-135R aircraft with inoperable TEMS, retrieve the major and minor cycles for each sortie in addition to the IFD form.

10.3.1. Ensure the proper forms are provided to aircrews and returned to maintenance debriefing for each sortie or mission.

**11. Operations Group Commander.** Aircrew cooperation is essential for the success of the program. Accurate, complete, and timely data are the necessary first steps towards maintaining more reliable aircraft, capable of mission completion with fewer propulsion system problems. The operations group commander will appoint a responsible individual as the operations' POC for the EMP.

## **12. Operations Point of Contact.**

12.1. Liaison with maintenance on EMP matters.

12.2. Determine appropriate actions to ensure aircrews understand EMP and benefits of an effective program.

12.3. Advertise EMP special interest items at aircrew briefings and safety meetings.

12.4. Ensure sufficient quantities of IFD forms are available and made a standard part of the aircrew trip kit and mission folder, as required.

12.5. Ensure aircrews complete IFD forms, as required.

## **13. C-9A and C-141 Aircrews.**

13.1. Complete an IFD form once each flight, not to exceed two per day (AMC Form 329, **C-141/TF33-P7 Engine Condition Monitoring Inflight Data Worksheet**, and AMC Form 465, **C-9A/C Engine Inflight Monitoring Data**, or equivalent contractor form.).

13.1.1. Do not record in turbulence. For data to be consistent, recording must be accomplished during straight and level flight.

13.1.2. Adjust throttles so engine pressure ratio (EPR) indications are the same, allow stabilization period, then record data.

13.1.3. Collecting data is not required on local training flights.

13.2. Place IFD forms in the aircraft forms' binder until aircraft returns to home station.

13.3. On return to home stations, turn in completed forms to maintenance debriefing.

#### 14. C-, EC-, and KC-135 Aircrews.

14.1. For non-TEMS equipped aircraft, complete an IFD form once during each flight. (AMC Form 224, **TF33 Equipped—135 Aircraft Cruise Based Inflight Data Sheet**). Return the completed form to maintenance debriefing.

14.2. For TEMS equipped aircraft, when TEMS is inoperable, complete an IFD form for each sortie. Document each major and minor cycle. One major cycle (1.0) represents takeoff to full stop landing and a minor (.25) cycle includes all touch and goes (AFTO Form 782, **KC-135R Inflight Data Sheet, TDY and TEMS Inoperable**).

14.3. When mission restrictions do not allow completion of the IFD form, indicate data, major or minor cycles, hours flown, and reason for noncompliance in the remarks section of the form. Return forms to maintenance debriefing.

14.4. Upon deployment for over 96 hours to bases without automated CEMS IV and no EMS D/DU download device is available, accomplish an IFD form on each sortie and turn into maintenance debriefing after each flight. If no debriefing capability exists, the aircraft commander will delegate responsibility to ensure the IFD form is sent back to home station as directed by the unit EMP monitor.

14.5. Upon deployment for over 96 hours to bases operating under automated CEMS IV, the ECMP/TEMS records will be transferred via 3-1/2" or 5-1/4" floppy disk. Turn disks in as directed by the unit EMP monitor. Debriefing will ensure the unit EMP monitors receive the disks.

14.6. Upon scheduled landings for less than 96 hours away from home station, the aircraft commander will collect the IFD forms and provide them to maintenance debriefing upon return to home station. Should an unscheduled landing extend past 96 hours away from home station, and more sorties than the recovery sortie out of the base are flown, apply the provisions in paragraph [14.4](#).

#### 15. C-17 Aircraft.

15.1. Engine Management Branch (EMB) will:

15.1.1. Appoint two representatives responsible for maintaining the C-17 engine health program.

15.1.2. Establish a Optical Quick Access Recorder (OQAR) disk and QAR tape drop-off location within the EMB complex.

15.1.3. Maintain a log of all OQAR disks and QAR tapes received from AMU and note any discrepancies found.

15.1.4. Upload OQAR Disks and QAR tapes into the Engine Health Monitoring System (EHMS).

15.1.4.1. Maintain a log of all corrections to the G081, CEMS, and EHMS as a result of OQAR/QAR data processing.

15.1.4.2. Reformat OQAR disks utilizing contractor provided software after data is successfully transmitted to the CDB.

15.1.5. **NOTE:** It is acceptable to utilize a locally manufactured tape label (NSN 7530-01-289-8191 or equivalent) to allow for annotation of the aircraft serial number, installation date, and removal date information that is required per TO 1C-17A-2-31JG-30-1. Place the label over the Installed/Removed blocks on the OQAR manufacturers label after OQAR disk reformatting.

15.1.6. Review EHMS data daily for previous uploads, trends, shifts, cautions, and alarms.

15.1.7. Coordinate with the AMU on discrepancies requiring maintenance actions and establish a JCN and an open discrepancy in the aircraft 781A forms for discrepancies requiring maintenance actions.

15.2. AMXS/AMU will:

15.2.1. Maintain an adequate inventory of serviceable blank OQAR disks and QAR tapes.

15.2.2. Ensure that an adequate amount of blank OQAR disks or QAR tapes is on board deploying aircraft.

15.2.3. Remove and install replacement OQAR disks or QAR tapes at Combined Pre-Flight/Post Flight inspection accomplishment and annotate disks or tapes with accurate aircraft serial number, installation date, and removal date.

15.2.3.1. Deliver removed OQAR disks or QAR tapes from the aircraft to the designated EMB drop-off location.

15.2.4. Ensure OQAR disks or QAR tapes are removed and delivered directly to EMB immediately prior to every engine change.

15.2.4.1. Reprogram the mission computer upon engine change and/or aircraft propulsion data management computer change.

15.2.4.2. Reprogram the mission computer upon replacement of OQAR battery.

15.2.5. Inform EMB on any troubleshooting or maintenance action performed on “watch status” engines.

15.2.5.1. Reprogram the mission computer upon engine change and/or aircraft propulsion data management computer change.

15.2.6. Inform EMB on any troubleshooting or maintenance action performed on “watch status” engines.

15.3. MOS MOF Maintenance Analysis will:

15.3.1. Intermediate between EMB and Tinker AFB CDB when problems arise.

15.3.2. Provide troubleshooting and maintenance support for EHMS hardware, telecommunications connections, and network connections to Tinker AFB CDB.

15.4. Airlift Squadrons will:

15.4.1. Ensure wing number, date, and time is annotated when entering OQAR or QAR mission identification information.

15.4.2. Aircrews will ensure QAR tapes are submitted to debrief upon landing (when a processing facility is available) or return the QAR tapes to home station debrief/drop off station upon completion of the entire mission.

## **16. C-32A Aircraft.**

16.1. Units will comply with Engine Condition Monitoring and Oil Consumption Program as per Federal Aviation Administration (FAA) Advisory Circular 120-42A, *Extended Range Operation with Two Engines (ETOPS)*, Appendix 4, *ETOPS Maintenance Procedures*.

**17. C-130 Aircraft.** This instruction is not applicable. No ET&D program exists for the T-56 engine.

## ***Section D—Programs and Special Instructions***

### **18. Instructions for Developing and Maintaining Nonautomated System Engine Performance Folders.**

18.1. The EMP monitor will maintain an engine performance folder for each assigned aircraft. As a minimum, folders will contain the following items for each engine:

18.1.1. AMC Form 330 or CEMS IV maintenance disk for current engines installed.

18.1.2. Last 10 IFD forms on each engine.

18.1.3. Floppy disk for each aircraft. Disk will contain engine performance evaluation trend data sheets. For C-, EC-, and KC-135 aircraft, the engine maintenance summary, as developed on the ECMP and CEMS IV software, will be on floppy disk.

18.1.4. Additional information, such as engine field maintenance test log, installed engine trim sheets, quality reports (TF39 - MADARS tape PZO, current F9035 engine history, F8050 cycle/hourly history), oil analysis program results, and AMC Form 227 for current engines installed, may be added to the folder to enhance the program if so desired by the EMP monitor.

### **19. Instructions for Maintaining Automated CEMS IV System Engine Trending and Diagnostic Data.**

19.1. Input EMS automated or IFDS data into automated/CEMS IV system upon receipt and backup data on disk daily.

19.2. Update automated/CEMS IV maintenance summary as maintenance corrective actions are received and backup data on disk daily.

19.3. As a minimum, backup any changes to ET&D automated/CEMS IV data on a disk daily.

19.4. For automated/CEMS IV systems, locate additional information, such as engine field maintenance test log, installed engine trim sheets, oil analysis program results, and AMC Form 227 for current engines installed. These may be added to the CEMS engine management records to enhance the program, if so desired by the engine manager.

## **20. Special Instructions for the Engine Monitoring Program Monitor.**

20.1. Enter completed IFD forms information into ECMP and CEMS IV computer in chronological order.

20.2. No two engines are identical in performance; therefore, each engine will establish its own baseline. Once an engine establishes its own baseline, it should not vary far from the baseline unless there is a malfunction. The first 10 flights (6 takeoff/flights for C-5/TF39) will be used to establish a baseline on newly installed engines. Establish a new engine baseline (C-5 MADARS baseline update is automatic) any time significant two-level maintenance or field repair (i.e., internal gas path component change, MEC, CIT, VSV/VBV re-rigging, engine wash, etc.) is accomplished.

20.3. Engine performance data should be readily available to SGF/AMU supervisors or shift chiefs to assist in troubleshooting reported EMP discrepancies on any shift.

**21. Forms Prescribed.** AMC Form 224, **T33 Equipped--135 Aircraft Cruise Based Inflight Data Sheet**; AMC Form 227, **Aircraft Instrument Checkout Data**; AMC Form 329, **C-141/TF33-P7 Engine Condition Monitoring Inflight Data Worksheet**; AMC Form 330, **Engine Maintenance Summary**; AMC Form 465, **C-9A/C Engine Inflight Monitoring Data**. (NOTE: AMC Forms 224, 330, and 465 are available electronically; order AMC Forms 227 and 329 through local base publications distribution offices.)

JAMES L. LEMONS, Colonel, USAF  
Deputy Director of Logistics

## Attachment 1

## IN-FLIGHT DATA TRANSMITTAL MESSAGE FORMAT

MAM120434

01 01 JUN 92 RR UUUU

HOME STATION//LG//

UNCLAS

SUBJECT: ENGINE MONITORING DATA.

THE FOLLOWING DATA IS SUBMITTED ACCORDING TO AMCI 21-107:

1. AIRCRAFT TYPE/TAIL NUMBER:
2. DATE AND TAKEOFF TIME OF SORTIE:
3. ACFT COMMANDER/CREW NUMBER:
4. FLIGHT DATA FOR (A) AIRCRAFT COMMANDER (B) PILOT (C) NAVIGATOR  
ALTITUDE IAS TAS MACH OAT  
(A)  
(B)  
(C)
5. WEATHER AT FLIGHT ALTITUDE:
6. TARGET ENGINE POWER SETTING:
7. ENGINE PERFORMANCE DATA: (A) EPR--NEAREST 0.01 (B) RPM--NEAREST 0.1 PERFECT  
(C) EGT--NEAREST 5 DEGREES (D) FUEL FLOW--NEAREST 100 LBS (E) THROTTLE  
POSITION--NEAREST 1/4 INCH (F) VIBRATION CODE (G) OIL SERVICED--QUARTS.

ENG

POS 1 2 3 4

- (A)
- (B)
- (C)
- (D)
- (E)
- (F)
- (G)

8. OAT AFTER RECORDING DATA:

9. FLIGHT TIME:

10. REMARKS: USE FOR PROBLEMS OR NOTEWORTHY COMMENTS.//

UNCLASSIFIED

**Attachment 2****IC 2002-01 TO AMCI 21-107, ENGINE MONITORING PROGRAM (EMP) 18 MAY 1998****15 April 2002*****SUMMARY OF REVISIONS***

This interim change 2002-01 to AMCI 21-107 provides guidance and new procedures for disposition of original Quick Access Recorder (QAR) tapes. Due to database conversion, original QAR tapes will no longer be erased and returned to the flight line. Instead, retain QAR tapes for a period of two years. After two years units will dispose of the tapes per AF directives.

15.1.5. Units will retain original QAR tapes instead of disposing of them when full for a period of two years. Data base conversion requires historical tape data be retained as back-up in case data is lost during conversion. After two years dispose of the tapes in accordance with AF disposition directives.

JAMES L. LEMONS, Col, USAF

Deputy Director of Logistics

**Attachment 3****IC 2003-01 TO AMCI 21-107, ENGINE MONITORING PROGRAM (EMP)****15 APRIL 2003*****SUMMARY OF REVISIONS***

This interim change 2003-01 to AMCI 21-107 provides guidance and new procedures for the use of the C-17 aircraft Optical Quick Access Recorder discs and Quick Access Recorder tapes. A bar (\*) indicates change from previous edition.

- 15.1.2. Establish a Optical Quick Access Recorder (OQAR) disk and QAR tape drop-off location within the EMB complex.
- 15.1.3. Maintain a log of all OQAR disks and QAR tapes received from AMU and note any discrepancies found.
- 15.1.4. Upload OQAR Disks and QAR tapes into the Engine Health Monitoring System (EHMS).
  - 15.1.4.1. Maintain a log of all corrections to the G081, CEMS, and EHMS as a result of OQAR/QAR data processing.
  - 15.1.4.2. Reformat OQAR disks utilizing contractor provided software after data is successfully transmitted to the CDB.
- 15.1.5. **NOTE:** It is acceptable to utilize a locally manufactured tape label (NSN 7530-01-289-8191 or equivalent) to allow for annotation of the aircraft serial number, installation date, and removal date information that is required per TO 1C-17A-2-31JG-30-1. Place the label over the Installed/Removed blocks on the OQAR manufacturers label after OQAR disk reformatting.
- 15.1.6. Review EHMS data daily for previous uploads, trends, shifts, cautions, and alarms.
- 15.1.7. Coordinate with the AMU on discrepancies requiring maintenance actions and establish a JCN and an open discrepancy in the aircraft 781A forms for discrepancies requiring maintenance actions.
- 15.2. AMXS/AMU will:
  - 15.2.1. Maintain an adequate inventory of serviceable blank OQAR disks and QAR tapes.
  - 15.2.2. Ensure that an adequate amount of blank OQAR disks or QAR tapes is on board deploying aircraft.
  - 15.2.3. Remove and install replacement OQAR disks or QAR tapes at Combined Pre-Flight/Post Flight inspection accomplishment and annotate disks or tapes with accurate aircraft serial number, installation date, and removal date.
    - 15.2.3.1. Deliver removed OQAR disks or QAR tapes from the aircraft to the designated EMB drop-off location.
  - 15.2.4. Ensure OQAR disks or QAR tapes are removed and delivered directly to EMB immediately prior to every engine change.
    - 15.2.4.1. Reprogram the mission computer upon engine change and/or aircraft propulsion data management computer change.
    - 15.2.4.2. Reprogram the mission computer upon replacement of OQAR battery.

15.2.5. Inform EMB on any troubleshooting or maintenance action performed on “watch status” engines.

15.3. MOS MOF Maintenance Analysis will:

15.3.1. Intermediate between EMB and Tinker AFB CDB when problems arise.

15.3.2. Provide troubleshooting and maintenance support for EHMS hardware, telecommunications connections, and network connections to Tinker AFB CDB.

15.4.1. Ensure wing number, date, and time is annotated when entering OQAR or QAR mission identification information.

JAMES L. LEMONS, Col, USAF

Deputy Director of Logistics