



DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

10 SEP 2004

Office of the Assistant Secretary

Scott J. Bloch
Special Counsel of the United States
U.S. Office of Special Counsel
1730 M Street, NW, Suite 300
Washington, DC 20036-4505

Re: OSC File No. DI-04-0756

Dear Mr. Bloch

This letter responds to your March 3, 2004, letter regarding the above-captioned file. As explained in your letter, you concluded that there was "a substantial likelihood" that information provided to your office by an aerospace engineer at Warner Robins Air Logistics Center (WRALC), Robins Air Force Base, Georgia, disclosed a "substantial and specific danger to public safety arising out of actions by employees at WRALC." You therefore referred that information to us "to conduct an investigation of the allegations and prepare a report."

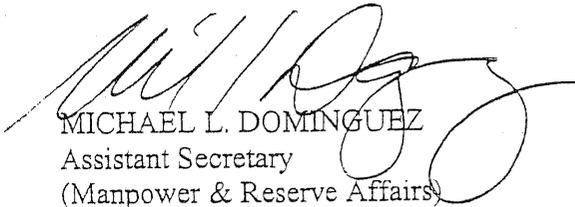
As a result, the Commander of Air Force Materiel Command convened a Commander Directed Investigation (CDI) into the assertion that the approval of the implementation of a deviation to established Technical Orders for repair to a main engine component of a C-5A by turning down an engine mount bearing was improper and jeopardized the flight safety of that aircraft.

The CDI included the authority to interview witnesses, take sworn testimony, and review all documents, files, and other relevant matters that were not otherwise privileged. A propulsion structures technical expert was detailed to assist the investigating officer.

Our findings are as set forth in the attached report which meets the requirements of 5 U.S.C. § 1213(d). As indicated more fully therein, our report does not substantiate the allegation since the repair represented no measurable increased flight safety risk to the C-5 fleet or the public at large.

The accompanying report has been reviewed by our Office of the General Counsel. In addition, I have reviewed the report and am satisfied with it. I have been delegated, by the Secretary of the Air Force, the authority to sign this letter transmitting the attached report.

Sincerely


MICHAEL L. DOMINGUEZ
Assistant Secretary
(Manpower & Reserve Affairs)

Attachment: Report w/listed attachments

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CENTRAL OFFICE
WASH. D.C.
U.S. OFFICE OF
SPECIAL COUNSEL
2004 AUG 20 PM 1:33

REPORT ON
COMMANDER DIRECTED INVESTIGATION
(CDI)

Prepared by

Col Rebecca L. Beaman
Investigating Officer
Air Force Materiel Command

concerning

OSC Case File Number DI-04-0756

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Section I.

1.1 Authority and Scope.

1.1.1 General Gregory S. Martin, Commander, Air Force Materiel Command, appointed Colonel Rebecca L. Beaman on 9 April 2004 to conduct the Investigation into Mr. Mark Taylor's allegations. Mr. Taylor filed his complaint with the Office of Special Counsel prior to 10 February 2004. The Investigation was conducted from 10 April 2004 to 17 May 2004 at Robins AFB, GA; Maxwell AFB, AL; and Wright Patterson AFB, OH.

1.1.2 General Martin also detailed Mr. Vincent Spanel, ASC/EN to serve as a Technical Advisor to assist in conducting the CDI.

1.1.3 The investigation was initiated based on a request from the Office of Special Counsel. The memorandum from OSC and CDI appointment letter are at Tab A.

1.2 Introduction: Background and Allegations.

1.2.1 Background.

1.2.1.1 A C-5A engine is attached to the pylon at three points, the back two of which are aft bearing holes referred to as "mouse ears" because of their shape (see Fig 1, excerpt from TO 1C-5A-3-1). The engine mount bearing discussed in this report is made to fit inside the pylon mouse ear. Over the life of the pylon, the mouse ear may be subject to corrosion, and when the corrosion is removed, the diameter of the bearing hole enlarges slightly. Engine mount bearings come in four sizes (the originally installed size plus three "oversizes") to accommodate this change.

1.2.1.2 When a bearing hole is not the proper size to accept one of the four bearings, but it is not bigger than the biggest bearing, Technical Order (TO) IC-5A-3, Section VI, Paragraph 6-17, Figure 6-9) indicates that the approved procedure is to enlarge the bearing hole until the next larger engine mount bearing can be used. The repair that is the subject of this investigation sized down the bearing instead of enlarging the bearing hole.

1.2.2 Allegation. Mr. Taylor alleges that:

Mr. Albert Lowas, then Chief, C-5 Structural Engineering Branch, and Mr. Scott Vandersall, then Chief, C-5 Airlift Division approved the implementation of a deviation to established Technical Orders for repair to a main engine component of a C-5A, authorizing the repair to be made by sizing down an engine mount bearing, which was improper and jeopardized the flight safety of that aircraft.

1.2.3 Conclusion. The CDI concludes that the repair authorized by WR-ALC for sizing down the bearing to a dimension matching the pylon fitting on C5-A aircraft tail number 70-0465 represents no measurable increased risk to the C-5 fleet or the public at large.

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1.3 **Chronology of Events.** See Tab B. Witness statements are at Tab E.

2. **Complaint with Attachments.** See Tab D. This section includes the following complainant-provided items:

- Witness List (for 107 Request numbers 03-109, 04-147 and 04-143)
- Information package concerning 107 Request #03-109
- Correspondence from Senator Saxby Chambliss to Complainant
- Privacy Act Release Form from Complainant to Sen. Chambliss
- DD Form 2655 with separate 2-page listing of corrective actions sought
- Complainant's AF Form 860B, completed 17 Nov 03; Complainant's civilian rating form, 01 Apr 02 – 31 Mar 03; Complainant's position description
- Complainant's request for lateral transfer and résumé
- Documentation on repairs made to aircraft 70-0459 (wing tip box assembly delamination)
- Four e-mails updating complainant's situation following the CDI interview

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Section II

3. Findings, Analysis, and Conclusions regarding the single allegation of this CDI:

That Mr. Albert Lowas, then Chief, C-5 Structural Engineering Branch, and Mr. Scott Vandersall, then Chief, C-5 Airlift Division approved the implementation of a deviation to established Technical Orders for repair to a main engine component of a C-5A, authorizing the repair to be made by sizing down an engine mount bearing, which was improper and jeopardized the flight safety of that aircraft.

3.1. Findings.

- a. On 11 Mar 03, Altus AFB personnel requested permission to implement a non-standard procedure, to size down a -109A size aft engine mount bearing from 2.5833" to 2.5757" by removing .0076" of material. The standard procedure is to enlarge the bearing hole, rather than sizing down the bearing, but this procedure requires special tooling only available at Warner Robins. (Tab A p6 (107 Request # 03-109, Discrepancy/Maintenance Required); Tab E (Whardo) item 3)
- b. Mr. Jonathan Despiau was the engineer assigned to assess and recommend disposition of this request. He was a junior engineer, graduated from Polytechnic University in Puerto Rico in 2002, and professes to have no formal structures training. At the time this request was routed to him for action, he had been working on C-5 aircraft for 8 months. He consulted with Mr. Mark Taylor, a more senior co-worker whom he considered to be his mentor, and Mr. Taylor advised him the part was flight critical. (Tab E (Despiau) items 1, 2)
- c. Mr. Despiau contacted Altus AFB to learn more about the proposed repair, and was told they would machine the part down after "wedging" it into position. He then consulted with Mr. Walter Tanner, a machinist at the Warner Robins Technical Industries Office, and Mr. Nicholas Nguyen, of Southwest Products, Inc. Both advised against approving the non-standard repair, citing concerns about how to properly fixture the part for machining, given the potential impacts of improper machining. (Tab E (Despiau) items 2, 5, 6, 7)
- c. Mr. Lowas consulted with someone at Altus AFB, and was told that this same repair had been done several times in the past, and they had a fixture at Altus to mount the bearing for machining. (Tape of Lowas interview, side 1, approx 12-15 minute point)
- d. Mr. Despiau advised Mr. Lowas of his recommendation, citing supporting advice from the Warner Robins Technical Industries Office and Southwest Products, Inc. Mr. Lowas told Mr. Despiau that WR-ALC would approve the repair, because it had been accomplished several times in the past. (Tab E (Despiau) item 9)
- e. Mr. Lowas approved implementation of the deviation to established Technical Orders in this instance, authorizing the repair to be made as requested. (Tab A p8)

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f. Mr. Taylor advised Mr. Vandersall, by e-mail, that he recommended against approving this request, even though Mr. Lowas had approved it, and that he remained concerned that the repair might jeopardize safety of flight. Mr. Taylor further stated that deviation from the TO requirements was not warranted on this "primary structure" item. (Tab E (Taylor) Item 3; Tab D (03-109 info package) p2)

g. Facts about the materials, structures, and processes:

- 1) When interviewed for the CDI, the following concerns were raised about this repair:
 - Fixturing: That the bearing could not be properly mounted ("fixtured") for machining (Tab E (Despiau) item 4; Tab E (Taylor) item 1b);
 - Strength: That the sizing down would reduce the strength of the bearing (Tab E (Despiau) item 7)
 - Quality Control: That tolerances required in the TO drawings could not be met by the proposed procedure (Tab E (Taylor) item 1d)
 - Temperature: That temperatures during machining would rise enough to change the material properties of the metal (Tab E (Despiau) item 12)
- 2) The pylon structure on this aircraft is 5Cr-Mo-V steel alloy, which is considered intermediate alloy steel but does not possess sufficient chromium to be considered a stainless steel (Tab C p2)
- 3) The aft engine mount bearings are made up of three separate pieces: the race, retaining ring, and spherical ball. The race and retaining ring are made from 17-4 PH steel, which has high strength and good corrosion resistance. The ball is made from 440C steel. All three are considered stainless steel alloys (Tab C p2)
- 4) The typical distress noted in this area is corrosion of the pylon fitting, which requires cleanup of the corrosion and refitting of the spherical bearing. As material is removed during the cleanup process, the fitting inner diameter may become oversized relative to the installed spherical bearings, and a larger outer diameter bearing may be required. (Tab C p2)
- 5) When rework of the pylon fitting inner diameter is necessary, special tooling is referenced by the technical orders. This tooling includes fixtures to maintain alignment of the bore and the cutting tool for material removal. Currently, WR-ALC appears to be the only facility having access to this tooling – it is not available at the base level repair shops. Technical data is available to describe the process and limits for conducting this work. (Tab C p2)
- 6) The bearings come in four sizes – the originally installed size and three bearings with increasingly larger outer diameters, with the largest (the -109A bearing) being .020 inches larger in diameter than the smallest (the -103A bearing). (Tab C, p2, para 2 lines 4-6; Tab C, p3 para 2 lines 9-10)

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- 7) The pylon fitting on this aircraft had been modified at some point in the past and had a dimension between the largest size bearing (the -109A bearing) and the next smaller size (the -107A bearing). Maintenance personnel determined that a -109A bearing had been sized down previously, to match the pylon fitting. (Tab C p2)
- 8) This repair request proposed to remove .0076 inches of material from the outer diameter of the -109A bearing (Tab C p3)
- 9) Altus AFB maintenance personnel use a fixture to hold the bearing during machining. (Tab C, figures 2-9)
- 10) Altus AFB maintenance personnel indicate low (less than 200 rpm) turning speeds are used, to minimize any machining-induced temperature concerns, when sizing down the aft engine mount bearing (Tab C p3)

3.2 Analysis

3.2.1 Fixturing: Photographs of the Altus AFB fixture were reviewed by the master machinist who originally expressed concern over proper fixturing of the bearing. After reviewing the photos of the tooling and its use, the machinist's assessment was that it was a viable fixture and could be used to machine the part to the proper dimensions. (Tab C p3)

3.2.2 Strength: Since the -109A bearing is .020 inches larger in diameter than the smallest sized bearing (the -103A), and only .0076 inches of material were to be removed on the diameter, the resulting configuration is still .0124 inches larger in diameter and would be stronger from a dimensional standpoint than the standard bearing. (Tab C p3)

3.2.3 Quality Control: 17-4PH (the material of the bearing race and retaining ring) is recognized as a machinable alloy and with reasonable attention is well within a field unit's machine shop capability. Shop personnel from Altus were contacted and they stated that tolerances were maintained to within .0005 inches. Concentricity requirements for the outer diameter on the Lockheed part drawing require .005 inches of total runout. (Tab C p3)

3.2.4 Temperature: Shop personnel from Altus were contacted and they indicated slow (less than 200 rpm) turning speeds were used to minimize any machining-induced temperature concerns. (Tab C p3)

3.3 Conclusion: The repair authorized by WR-ALC for sizing down the bearing (107 Request #03-109) represents no measurable increased risk to the C-5 fleet or the public at large. The allegation was not substantiated. (Tab C p3)