National Aeronautics and
Space Administration

Office of Inspector General
Washington, DC 20546-0001

February 15, 2008

TO: Director, Johnson Space Center

FROM: Assistant Inspector General for Auditing

SUBJECT: Final Memorandum on Review of a Shuttle Training Aircraft Mishap on October 19, 2007 (Report No. IG-08-009; Assignment No. S-08-006-00)

The Office of Inspector General (OIG) has completed a review of allegations made concerning a Shuttle Training Aircraft mishap on October 19, 2007. Our review was initiated in response to an anonymous complaint made on October 24, 2007. The complainant alleged that actions taken by the instructor pilot, the aircrew, and the Agency subsequent to the October 19 mishap at Kennedy Space Center (KSC), during which the Shuttle Training Aircraft was damaged, were improper and raised potential safety concerns. (See Enclosure 1 for details on our scope and methodology.)

Specifically, the complainant alleged that

- the instructor pilot and aircrew were aware of the damage to the aircraft but failed to report the damage in order to avoid mandatory mishap-related drug and alcohol testing;
- because of his age and history of aircraft mishaps, the instructor pilot is no longer capable of flying NASA aircraft safely; and
- some members of the mishap investigation board might not be sufficiently independent because the board was not formed in compliance with NASA regulations.

Executive Summary

We found that the actions taken by the instructor pilot and aircrew, with respect to reporting the mishap, complied with NASA regulations. We also found that the instructor pilot was up to date on all flight and medical certifications, was qualified and approved for duty as a Shuttle Training Aircraft instructor, and had received an annual flight proficiency evaluation to ensure that he had the ability to safely operate the aircraft.

We also found that the appointed chairperson of the mishap investigation board was an employee in the same organization as the instructor pilot and, therefore, may not be sufficiently independent to conduct an impartial assessment. NASA Procedural Requirements (NPR) 8621.1B, "Mishap and Close Call Reporting, Investigating, and Recordkeeping,"

May 23, 2006, requires that the chairperson of an investigating authority be independent of the program or facility that experienced the mishap or close call and states that members should not be from the direct chain of authority responsible for day-to-day or line management oversight of the facility, area, or activity involved in the mishap.

Because the mishap aircraft and aircrew were assigned to the Johnson Space Center (JSC) Aircraft Operations Division, the JSC Director has the authority to designate an investigation of the mishap under the provisions of NPR 8621.1B. The NPR does not require investigation by a mishap investigation board when the damage sustained as a result of the mishap is valued at less than $250,000. However, the Center Director determined that a mishap investigation board should investigate this mishap, as recommended by the JSC Chief of Aircraft Operations and the JSC Chief of Aviation Safety, because of the mishap's potential to have been more serious.

Our January 22, 2008, draft of this memorandum recommended that the JSC Director appoint a new chairperson, selected in compliance with NPR 8621.1B, to ensure that the board is sufficiently independent to conduct an impartial assessment.

Management's comments on the draft of this memorandum are responsive (see Enclosure 2). Although the JSC Director nonconcurred with our recommendation, our intent was to ensure that the mishap investigation board was sufficiently independent. Management's actions meet that intent. Therefore, we consider the recommendation resolved and closed.

Background

On October 19, 2007, a NASA Shuttle Training Aircraft assigned to the JSC Aircraft Operations Division clipped a tree while the pilot was attempting to land on the shuttle runway at KSC during a rain shower. The aircraft sustained minor damage to the left outboard wingtip, including a broken position light and strobe light. The aircrew members did not perform a post-flight inspection of the aircraft, due in part to thunderstorms in the KSC area. After landing the Shuttle Training Aircraft, the four aircrew members departed the airfield before the damage was discovered. Three went to a local hotel, and one returned as scheduled to Ellington Field, Texas, in a T-38.[1] Approximately 3 hours after the aircraft landed at KSC, maintenance personnel from JSC[2] examined and discovered the damage, which they reported to the JSC Aircraft Operations Division. The JSC Chief of Aircraft Operations and the JSC Chief of Aviation Safety recommended that a mishap investigation board investigate the mishap because of its potential to have been more serious. On November 13, 2007, the JSC Director established the mishap investigation board, approved the members, and requested a final report on the mishap by February 7, 2008.

[1] The astronaut trainee returned to Ellington Field; the instructor pilot was one of the three aircrew members who remained in the area.

[2] Maintenance personnel from JSC deploy with the Shuttle Training Aircraft for operations away from Ellington Field.

Allegations

Allegation 1. The instructor pilot and aircrew were aware of the damage to the aircraft but failed to report the damage in order to avoid mandatory mishap-related drug and alcohol testing.

We found no indication that the instructor pilot or aircrew either knew of the damage to the aircraft prior to its discovery by maintenance personnel or intentionally failed to report damage to avoid mandatory testing.

The aircrew reported that the instructor pilot attempted to make the approach to land on the KSC Shuttle runway prior to inclement weather moving into the area of the airfield. However, as the aircraft approached the airfield, the weather caused the aircrew to lose sight of the runway. The instructor pilot continued the approach using the aircraft's instruments. Upon regaining visual contact with the ground, the aircrew realized they were too low to continue the approach. The instructor pilot added power and executed a climb into a holding pattern. The aircraft landed at KSC after the tower advised the instructor pilot that the runway had cleared of the weather.

The aircrew members stated they were not aware that the aircraft was damaged during the flight or immediately after landing at KSC. However, after landing, several of the aircrew independently approached the JSC Chief of Aviation Safety, who had deployed to KSC, reporting what they perceived as a close call. According to the KSC Daily Record of Facility Operations log, a Phase II Lightning Warning[3] was issued approximately 20 minutes prior to the aircraft landing at KSC. Aircrew members stated that the warning prevented them and maintenance personnel from being on the tarmac immediately following the landing. In addition, maintenance personnel were occupied with another aircraft that had landed immediately after the Shuttle Training Aircraft. Airfield tower personnel reported seeing sparks emanating from the second aircraft upon landing and called for a crash and fire rescue response.[4] Subsequently, maintenance action was required to remove that second aircraft from the runway.

As a result, JSC and contract maintenance personnel at KSC did not discover the damage to the Shuttle Training Aircraft until approximately 3 hours after the aircraft landed. The aircraft damage was minimal and confined to the wingtip. The repair estimate showed that the strobe light, strobe light lens, static wick, and position light needed to be replaced.

When a mishap results in a serious injury or damage estimated in excess of $10,000, NPR 8621.1B requires mandatory drug testing.[5] Upon discovering the damage, the deployed

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[3] A Phase II Lightning Warning is issued when lightning is imminent or occurring within 5 miles of the airfield. All lightning-sensitive operations cease until the warning is lifted.

[4] According to the KSC Fire and Rescue Incident Report, there was no fire. Comments in the report speculate that the sparks observed may have been the reflection of the landing lights in the standing rainwater on the runway.

[5] NPR 8621.1B addresses drug testing, but not alcohol testing, after a mishap.

JSC maintenance personnel contacted the JSC Operations Duty Officer at Ellington Field, who then notified the JSC Chief of Aviation Safety, who in turn notified the aircrew of the damage to the aircraft. JSC Aircraft Operations Division personnel required the aircrew members to submit urine samples before the exact dollar amount of the damage was determined. All urine samples were submitted for testing within approximately 8 hours after the mishap, which was approximately 5 hours after discovery of the damage. NPR 3792.1B, "Plan for a Drug-Free Workplace," July 29, 2006, states that once the criteria in NPR 8621.1B has been met, and appropriate approvals have been obtained, "a test should be scheduled as expeditiously as possible." All samples tested negative for the presence of prohibited drugs.

No alcohol test was conducted because NPR 8621.1B does not address testing for alcohol. The NASA Chief of Safety and Mission Assurance made a recommendation to address the issue of alcohol testing in his report, "Space Flight Safety Review (Alcohol Use In The Preflight Period)," August 27, 2007. The OIG is planning to begin an audit in 2008 that will assess the Agency's action in response to the recommendations made in that report as well as other reports that addressed the use of alcohol by NASA astronauts and pilots.

Allegation 2. The instructor pilot, because of his age and history of aircraft mishaps, is no longer capable of flying NASA aircraft safely.

We found that the instructor pilot was in compliance with NASA requirements to fly and that his mishap "history," as documented by JSC, consisted of only two other mishaps: one in 1988 and one in 1991.

NASA does not have a specific age limit for pilots. Instead, NPR 7900.3B, "Aircraft Operations Management," June 14, 2007, states that pilots 55 years of age and older shall be medically qualified every 6 months. The instructor pilot, who was over 55, had completed his last flight physical in July 2007. That flight physical deemed him medically qualified for flight operations.

NPR 7900.3B also requires annual flight proficiency evaluations to ensure the safe operations of NASA aircraft. The instructor pilot was up to date on all flight evaluations. A note included on the "Certificate of Aircrew Qualification" following his annual proficiency check flight on April 24, 2007, stated, "Excellent flight with very strong emphasis on using good CRM [Crew Resource Management] techniques." In April 2007, the instructor pilot also underwent a Pilot Evaluation Board review, which reapproved him for duty as a NASA instructor in the Shuttle Training Aircraft, a T-38 instructor pilot, and a Gulfstream III Pilot-in-Command.

In response to the allegation of prior mishaps, the JSC Chief of Aircraft Operations, provided documentation that showed the instructor pilot had only two prior mishaps, which had occurred more than a decade ago:

- In 1991, while the instructor pilot was taxiing a Shuttle Training Aircraft after landing at night at El Paso International Airport, Texas, the aircraft wingtip impacted a metal modular hangar for light aircraft. The primary cause was determined to be failure of

the aircraft commander (the instructor pilot) to ensure clearance from the obstacle. The incident investigation noted significant contributing factors, such as lack of lighting on the hangar and nearby ramp, bright lights from opposite-direction traffic, crew coordination, distraction, and complacency. A secondary cause was attributed to the El Paso tower for failure to positively control movement of the taxiing aircraft.

- In 1988, the instructor pilot landed a T-38 at Ellington Field prior to extending the landing gear following a post-maintenance Functional Check Flight. The cause of the mishap was determined to be the failure of the pilot to lower the landing gear prior to landing. Contributing causes included the interruption of the pilot's normal habit pattern due to weather in the area and the absence of a rear-seat crewman or ground observer to warn the pilot that the landing gear was not down.

Both investigations categorized the mishaps as causing minor damage. Neither mishap investigation made any recommendation, disciplinary or procedural, specific to the instructor pilot. We verified this information with the JSC Chief of Aviation Safety who also added that the instructor pilot had no past Federal Aviation Administration violations.

Allegation 3. The mishap investigation board selected to review this mishap was not formed in compliance with NASA regulations and may not be sufficiently independent.

We found that the mishap investigation board was not formed in strict compliance with NASA regulations. However, an investigation by a mishap investigation board is not required when the damage sustained as a result of the mishap is valued at less than $250,000.

NPR 8621.1B establishes the investigation appointing authority and identifies the type of investigation required based on the severity of the incident and value of property damage. The total property damage to the Shuttle Training Aircraft was less than $2,000 and, therefore, classified as a "Type D mishap." Type D mishaps, which include mishaps involving property damage of more than $1,000 but less than $25,000, do not require formation of a mishap investigation board; however, the Center Director has the authority to establish a board if he or she believes the mishap is a high-visibility event. The JSC Chief of Aircraft Operations and the JSC Chief of Aviation Safety recommended that a mishap investigation board investigate the mishap because of its potential to have been more serious. On November 13, 2007, the JSC Director established the mishap investigation board, approved the members, and requested a final report on the mishap by February 7, 2008.

NPR 8621.1B requires that the chairperson for all mishap investigation boards be independent of the program or facility that experienced the mishap or close call and that board members shall not be from the direct chain of authority responsible for day-to-day or line management oversight of the facility, area, or activity involved in the mishap or have a vested interest in the outcome of the investigation. Although the other members of the mishap investigation board meet the requirements of the NPR, the chairperson appointed for this board was an employee of the JSC Aircraft Operations Division, the same organization employing the instructor pilot. In addition, the chairperson had conducted flight evaluations for the instructor pilot less than a year before the mishap. Consequently, the chairperson of the mishap investigation board

could be viewed as having organizational and individual impairments that may inhibit an independent investigation.

Recommendation, Management's Response, and Evaluation of Management's Response

We recommended that the Johnson Space Center Director appoint a new mishap investigation board chairperson in compliance with NPR 8621.1B.

Management's Response. The JSC Director nonconcurred, stating that the board was nearing completion of its assessment and redirection of the board would delay the report and add risk to flight operations.

Additionally, the Director stated that, based on the recommendation of NASA's Chief of Safety and Mission Assurance, he supplemented the board membership by adding the NASA Safety Center's Technical Expert for Aviation and Operations to ensure the board's independence. In addition, the Director stated that the findings and recommendations of the board's report will be vetted through the normal endorsement process.

Evaluation of Management's Response. Management's action is responsive. Our recommendation was to ensure that the mishap investigation board was sufficiently independent. Although not in strict compliance with NPR 8621.1B, the Director's actions provide for oversight of the board's independence during the mishap investigation and reporting process. In addition, we agree that delaying the board's report is not in the Agency's best interest. We consider the recommendation resolved and closed.

We appreciate the courtesies extended during our audit. If you have any questions, or need additional information, please contact Mr. Raymond Tolomeo, Science and Aeronautics Research Director, at 202-358-7227.

signed

Evelyn R. Klemstine

2 Enclosures

cc:
Chief, Safety and Mission Assurance
Chief Engineer

Scope and Methodology

We conducted this review from November 2007 through January 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the review to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our objectives. The objective of our review was to determine whether the allegations contained in a hotline complaint concerning a Shuttle Training Aircraft mishap on October 19, 2007, could be substantiated. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions.

For this review, we

- interviewed JSC and contract maintenance personnel and aircrew involved in the mishap, safety officials, JSC Aircraft Operations Directorate officials, and KSC aircraft operations and fire and rescue officials;

- reviewed applicable regulations including NPR 8621.1B, "Mishap and Close Call Reporting, Investigating, and Recordkeeping," May 23, 2006; NPR 7900.3B, "Aircraft Operations Management," June 14, 2007; and NPR 3792.1B, "Plan for a Drug-Free Workplace," July 29, 2006;

- obtained and reviewed documentation outlining the events leading up to and subsequent to the mishap to include the Shuttle Training Aircraft Flight Schedule, the Shuttle Landing Facility Aircraft Operations Log, the KSC Daily Record of Facility Operations, KSC Fire Rescue Incident Report, and the Replacement and Labor Cost Estimate for the Shuttle Training Aircraft;

- obtained and reviewed the JSC Director Memorandum, "NASA 944 Tree Strike During Landing Approach, October 19, 2007," dated November 13, 2007, appointing and approving the membership of the mishap investigation board; and

- obtained and reviewed the personnel files for the instructor pilot in charge of the aircraft to include the Individual Currency Report, which contains both medical and flight currency information, and the Certificate of Aircrew Qualification, which shows the qualifications granted to the instructor pilot in each model aircraft.

Computer-Processed Data. We did not use computer-processed data to perform this audit.

Prior Coverage. There was no prior coverage of this incident.

Management's Comments

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696

February 8, 2008

Reply to Attn of CA-07-56

TO: NASA Headquarters
Attn: Assistant Inspector General for Auditing for Office
of the Inspector General

FROM: AA/Director

SUBJECT: Draft Memorandum on Review of Allegations Concerning a Shuttle Training Aircraft Mishap on October 19, 2007 (Assignment No. S-08-006-00)

I appreciate the thorough and professional review conducted by your office regarding the subject mishap. As requested, I am providing these comments in response to your recommendation included in the draft memorandum.

I concur with your findings that the first two allegations are without merit. However, regarding the third allegation, I do not concur with your recommendation to appoint a new Mishap Investigation Board (MIB) chair. The board is nearing completion of their assessment and is on schedule to provide their findings to me in early February. Redirection of this board at this time would add risk to our flight operations by delaying a report that will enhance our aviation safety.

Further, as you noted in your report, NASA Procedural Requirements 8621.1B, "Mishap and Close Call Reporting Investigating, and Recordkeeping," did not require an MIB-level investigation of this incident due to the low damage cost. However, in my judgment, the incident had serious potential and warranted a formal board investigation. After consultation with Office of Safety and Mission Assurance at NASA Headquarters, I appointed a 5-person investigation board. The members of this board, including the chairperson, were appointed after obtaining the written concurrence of Bryan O'Connor, Chief for the Office of Safety and Mission Assurance. In addition, I supplemented the independence of the investigation, as recommended by Mr. O'Connor, by assigning the NASA Safety Center's Technical Expert for Aviation and Operations to the board. This individual has been actively participating in the board functions since the board was formed. Finally, the findings and recommendations of this report will be vetted through the normal endorsement process.

We look forward to working with you on your final report and stand ready to assist as needed.

Michael L. Coats

Enclosure

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