AIRCRAFT ACCIDENT INVESTIGATION

AUTHORITY: Under the provisions of Air Force Instruction (AFI) 51-503, the Ninth Air Force Commander, Lieutenant General Carl E. Franklin, appointed Lt Col Michael J. Quinlan (Y-1) to conduct an aircraft accident investigation where an F-16 CG (89-2093), while participating in Exercise "Quick Force 96" at Kirtland AFB/Albuquerque International Airport (IAP), NM on 31 July 1996, attempted a high speed abort during takeoff and departed the runway. The investigation was conducted at Kirtland AFB NM from 4 Sep 96 to 9 Sep 96; at Moody AFB GA from 10 Sep 96 to 14 Sep 96; and again at Kirtland AFB NM from 15 Sep 96 to 4 Oct 96. The investigation continued at Shaw AFB from 5 Oct 96 to 12 Nov 96. Appointed as technical advisors were: Major Wayne H. Albright, 150th Fighter Wing (FW), F-16 Maintenance Officer; Captain Ann C. Turetsky, 377th Air Base Wing Judge Advocate (ABW/JA), Legal Advisor; and Captain Jonathan O. Beasley, 20th FW, F-16 Instructor Pilot (IP) (Y-2 through Y-4).

PURPOSE: An aircraft accident investigation is convened under AFI 51-503. The investigation is intended primarily to gather and preserve evidence for claims, litigation, disciplinary and administration needs. In addition to setting forth factual information concerning the accident, the investigating officer is also required to state his opinion concerning the cause or causes of the accident (if there is clear and convincing evidence to support that opinion), or to describe those factors, if any, that in the opinion of the investigating officer substantially contributed to the accident. The report is available for public dissemination under the Freedom of Information Act (5 U.S.C. 552) and AFI 37-131.

SUMMARY OF FACTS:

a. History of Flight: On 31 July 1996, Captain Peter H. Parsons (68th Fighter Squadron [FS], 347th FW, Moody AFB GA), the mishap pilot (MP), was scheduled as Number Three of a Surface Attack Tactics (SAT) mission supporting the U. S. Central Command Air Forces (CENTAF) directed Exercise "Quick Force 96 (QF 96)." Captain Darin S. Middleton led the mission (V-2). The flight was to depart its deployed location, Kirtland AFB/Albuquerque International Airport (IAP), at 1315 hours Mountain Daylight Time (MDT) and proceed at medium altitude to join a strike package tasked to simulate attacks on targets located within the Utah Test and Training Range (UTTR)(K-1). During an attempted takeoff on runway 17, the MP was not able to rotate the mishap aircraft (MA) at precomputed aircraft rotation speed, and subsequently attempted a high speed, heavy gross weight abort. The MA failed to engage the departure end BAK-14 arresting cable. The MA then proceeded past the departure end of the runway and through the paved runway overrun. The MP successfully ejected from the aircraft, and the MA came to rest 325 feet into the gravel runway overrun with significant damage to the forward fuselage, aircraft landing gear, engine, and external stores. The mishap site was the departure end of runway 17, Albuquerque IAP, NM.

b. Mission: The flight was scheduled and planned as a four-ship SAT mission as part of a QF 96 tasked strike package. Flight callsign was Lancer 51. The planned profile included single ship afterburner takeoffs, medium altitude cruise to the UTTR, medium altitude tactical ingress to a

target area, simulated medium altitude weapons delivery, target egress and return to Albuquerque IAP for visual approach and landing (V-1,V-2,V-3,V-4).

c. Briefing and Preflight: On 30 Jul 96 (the day prior to the mishap), all deployed 68 FS pilots reported to the 150 FW/188 FS, New Mexico Air National Guard (NMANG) for a local area orientation (LAO) briefing at 1000 hours MDT. This briefing was coordinated as part of an informal agreement between the 68 FS and the 188 FS for operations support during the 68 FS participation in QF 96 (V-5). The LAO was accomplished in lieu of individual pilot review of local area procedures utilized by the NMANG contained in MCI 11-F16, Volume 3, 150 FW Supplement 1, Chapter 8 - Local Operating Procedures (V-22). The LAO briefing was conducted in one of the 188 FS flight briefing rooms. The briefing was given by Captain Thomas M. Wheeler, 188 FS. The briefing was informal. Visual aids depicting the airfield layout were utilized to visually explain applicable procedures and techniques for operating at Albuquerque IAP. The use of arresting systems for runway 17 was specifically addressed (V-1,V-2,V-3,V-4,V-5). The letter of agreement between: Albuquerque ATC Tower, Air Traffic Manager; Albuquerque IAP Director of Aviation; Kirtland AFB Chief of Airfield Management; and the City of Albuquerque Chief Administrative Officer, addressing pilot procedures for requesting the BAK-12/14 arresting cable to be raised for takeoff, was not mentioned or referenced during the briefing (V-5, GG-1). A formal LAO briefing format or LAO briefing guide was not used during the briefing (V-5).

The MP's mission on 31 Jul 96 was to be the first mission flown by the 68 FS in support of QF 96. Initial mission planning for this mission was accomplished on 30 Jul 96. The MP and the other members of Lancer 51 flight reported to the 188 FS for duty at approximately 0800 hours MDT on 31 Jul 96. The flight briefing was scheduled to begin at 1100 hours MDT. Additional mission planning was accomplished between the time of arrival and the scheduled briefing time. Lancer 54 computed takeoff and landing data (TOLD) using weather information from the Automated Weather Dissemination System (AWDS) terminal located in the 188 FS operations facility. This weather information was confirmed via a verbal weather briefing. The TOLD, computed using the Computerized Flight Planning Software (CFPS) in the 188 FS, was: 168 knots calibrated airspeed (KCAS) rotation speed, 183 KCAS takeoff speed and 167 KCAS refusal speed. Specific mission details (to be transmitted to Lancer 51 flight via a Contingency Theater Automated Planning System [CTAPS] terminal by the mission commander) were not available until 1000 hours MDT. This resulted in delayed final mission planning and a ten minute late start of the flight briefing (V-1,V-2,V-3,V-4).

The flight briefing was conducted IAW MCI 11-F16, Volume 3. Local area procedures were redressed as well as special emphasis to the terrain/runway environment at the departure end of runway 17. Lancer 51 flight departed the 188 FS operations building for the flightline at approximately 1220 hours MDT (V-2). The MP conducted a preflight visual inspection of the MA IAW T.O. 1F-16CG-1CL-1. The MA was normal except that the relative height of the pitot tube to the MP was higher than normal (V-1). Lancer 51 flight started engines at approximately 1235 hours MDT (V-2). The MP requested maintenance assistance shortly following engine start due to an Inertial Navigation System (INS) alignment malfunction. Lancer 51 flight, Numbers one, two and four, taxied at 1300 hours MDT (V-49). Lancer 53, the MP, corrected his INS

malfunction using an alternate alignment procedure and taxied slightly late. The MP caught up to the rest of the flight before reaching runway 17 (V-2). During taxi to runway 17, the MP experienced unusual porpoising (bouncing) of the nose of the MA. The MP asked Lancer 52 if his aircraft was oscillating during taxi. Lancer 52 affirmed his aircraft was porpoising during taxi and attributed this to an irregular taxiway surface (V-1, V-3). Lancer 51 flight proceeded to runway 17. At 1315 hours MDT, Lancer 51 Flight switched to Albuquerque Tower radio frequency and requested clearance for takeoff (V-51). Lancer 51 did not request that the BAK-14 arresting cable at the departure end of runway 17 be raised (V-1-,V-2,V-3,V-4). Lancer 51 flight was directed by Albuquerque to hold short of the runway (V-51). At approximately 1319 hours MDT, Lancer 51 flight was cleared to taxi into takeoff position "to hold" on runway 17 (N-6, V-51). Lancer 51 taxied into position to hold and positioned the flight for a standard 4-ship line-up approximately 200-300 feet from the approach end of runway 17 (V-1,V-2,V-3,V-4). At approximately 1320 hours MDT, Lancer 51 was given departure instructions and cleared for takeoff (N-6, V-51).

d. Flight: At approximately 1320 hours MDT, Lancer 51 executed a standard maximum power (full afterburner) takeoff (V-2). Lancer 52, as briefed, began his takeoff 20 seconds after Lancer 51. Both takeoffs were normal (V-2,V-3). The MP began his takeoff 20 seconds after Lancer 52 (V-1). The MA engine performance was normal (V-1, J-52, J-53). At 156-160 KCAS, the MP began application of back pressure on sidestick controller to initiate rotation (J-6). The MP also inadvertently applied a slight amount of right roll input to the sidestick controller (J-6). The MP achieved full aft stick pressure at computed rotation speed of 168 KCAS (J-7). The MP felt no response to his rotational inputs (V-1), and initiated a high speed abort at 172-178 KCAS, approximately 3048 feet after the beginning of the takeoff roll (J-7). The MP made a radio transmission approximately two seconds after initiating abort procedures (J-7). This transmission was "stepped on" (interrupted by a simultaneous radio transmission from another source) and unintelligible (J-7, N-6). Two additional radio transmissions were made by the MP approximately two and five seconds later, respectively (J-7). The first was inaudible, and the second was garbled with a civilian airline radio transmission (J-7, N-6). A fourth radio transmission of "cable, cable, cable" was made by the MP six seconds later (the first to be heard and understood by the Albuquerque Tower local controller) (J-7, N-6). A final radio transmission of "cable, cable, cable...cable, cable, cable" was made by the MP seven seconds later (J-7, N-6). The Albuquerque Tower local controller, immediately upon hearing the request for the cable, attempted to activate the BAK-14 control button to raise the cable, but the ground controller had already hit the button (V-50,V-51). The control button subsequently illuminated "green" indicating the cable was in the raised position (KK-1). However, the MA had proceeded beyond the BAK-14 before the cable was raised (V-50). The MA proceeded past the departure end of the runway into the 190 foot long paved overrun. The MP initiated ejection procedures just prior to departing the paved overrun (V-1, J-16, J-33, J-35). The ejection seat departed the aircraft shortly after entering the gravel overrun. The MA ejection system functioned normally, and the MP landed approximately 155 feet into the gravel overrun and approximately 50 feet East of runway centerline (R-4). Lancer 54 began his takeoff 20 seconds after Lancer 53. After becoming safely airborne, Lancer 54 observed the ejection of Lancer 53 and took evasive action, maneuvering his aircraft to avoid potential conflict. Lancer 54 made a inter-flight radio transmission informing Lancer 51 and

Lancer 52 of the situation. Lancer 51 reformed the flight, proceeded west of the airfield to burn down fuel, and landed uneventfully at Albuquerque IAP (V-2,V-3,V-4).

Critical Action Procedures (CAPs) for abort were correctly initiated by the MP (J-7,V-1,V-8, V-10, AA-1).

An analysis of the TOLD used by Lancer 51 flight was conducted by Lockheed Martin Tactical Aircraft Systems (LMTAS) analysts. Using the same takeoff meteorological parameters used by the mishap flight (temperature and pressure altitude), the values for rotation and takeoff speeds were computed to be six KCAS less than the values computed by the mishap flight. Refusal speed computed by LMTAS analysts was one KCAS less than that used by the mishap flight (J-10, J-11, J-68). Detailed analysis of the Crash Survivable Flight Data Recorder (CSFDR) and accurate application of the MA weight and balance data/information (by LMTAS) provided additional information which highlighted conditions which impacted the validity of the mishap flight's computed TOLD (J-11, J-14). The inadvertent application of right roll input on the sidestick controller during takeoff roll by the MP had the effect of increasing both the rotation speed and takeoff speed by two KCAS (J-11). Computation of weight and balance data for the MA, utilizing computation charts not available to the mishap flight members, highlighted a vertical Center of Gravity (CG) 5.61 inches below the thrust line of the MA. This CG position effectively increased both rotation and takeoff speeds by an additional two KCAS (J-11).

Analysis of the effect of an improperly serviced nose landing gear (NLG) strut, with the same characteristics as those of the NLG strut on the MA, was also accomplished by LMTAS. Results indicated that the MA's improperly serviced NLG strut effectively increased rotation and takeoff speeds for the MA by eight KCAS (J-14).

The effective TOLD values for the MA (as computed by LMTAS) considering the combined effects of inadvertent flight control inputs, accurate weight and balance computations and the effects of the improperly serviced NLG strut on the MA were as follows:

Rotation Speed - 174 KCAS

Takeoff Speed - 189 KCAS

Refusal Speed - 166 KCAS

LMTAS also conducted a detailed analysis of the MA's deceleration values extracted from the CSFDR and the results of brake component teardown reports. The results of this analysis indicated that the braking potential of the MA was not maximized during its high speed abort (J-14, J15, J-29, J-30).

e. Impact: On 31 Jul 96, at approximately 1322 hours MDT, the MA departed the paved overrun of runway 17 at Albuquerque IAP (V-47,V-48,V-49,V-50,V-51). Departure point was approximately the runway centerline (S-2). The MA was traveling at approximately 76 KCAS (90 knots ground speed)(J-8). The MA came to rest approximately 325 feet into the gravel overrun, still very close to runway centerline(J-2, R-4).

f. Ejection Seat: The MP initiated a Mode 1 ejection just prior to departing the paved overrun of the runway (V-1, J-16, J-33, J-35). Due to the inherent delays of the ejection system associated with the time required for canopy separation from the aircraft following activation of the system (AA-2), the ejection seat departed the aircraft after the aircraft entered the gravel overrun (V-1,V-10). Technical analysis data from Life Sciences Equipment Laboratory (LSEL), Kelly AFB, TX (J-63), supports the MP's and rescue personnel testimony. Ejection seat catapult and rocket motor technical analysis by Naval Surface Warfare Center (NSWC) indicated normal operation of these ejection system components (J-59). The MP sustained a compression fracture of the first lumbar vertebrae (V-12). Again, technical analysis by LSEL indicated that, because there was no other collateral injuries to the MP, the most probable cause of injury could be attributable to "dynamic overshoot" (possibly induced by the negative "G" sustained during NLG collapse as the aircraft departed the paved overrun)(J-66).

g. Personal and survival equipment: A thorough review of all personal and survival equipment records indicated that the equipment inspections were all up to date (BB-1). Due to the rapid response by rescue personnel to the mishap scene, no personal survival equipment was used by the MP.

h. Rescue: On 31 Jul 96, at approximately 1322 hours MDT, the MA departed the paved overrun of runway 17 at Albuquerque IAP (V-47,V-48,V-49,V-50,V-51). Crash, rescue and medical personnel and equipment from the 377 Civil Engineering Squadron (CES) and 377 Medical Group (MEDGP) were already located in positions along runway 17 in response to a previously declared in-flight emergency (IFE) involving an engine fire aboard a C-141 aircraft (V-9,V-10,V-11,V-12). These resources were on-scene at the time of the mishap. As the MA departed the runway, the Albuquerque Tower broadcast, "Any crash vehicles on tower frequency, proceed down runway 35" (N-7). When the rescue personnel arrived at the MP's location following his landing in his parachute, the MP was already standing and disconnected from his parachute harness (V-9, V-11). The MP was stabilized by rescue and medical personnel in response to his complaints of back pain (V-9, V-11). The MP was subsequently transported to the hospital for further examination and treatment (V-9, V-11, V-12).

i. Crash Response: Because crash and rescue personnel and equipment were pre-positioned for a prior emergency situation, crash response to the mishap scene was immediate. Approximately 30 seconds following the radio report of the mishap by crash and rescue personnel, Albuquerque Tower activated the Crash Net. Crash and rescue equipment that responded to the mishap included: 2 x P-23 crash/firefighting vehicles, 1 x P-2 crash/firefighting vehicle, 1 x P-15 crash/firefighting vehicle, 1x P-20 firefighting vehicle, 1 x P-10 rescue truck, 2 x command vehicles (Chevy Suburbans), and 1 x ambulance. Additionally, a second ambulance was dispatched as a back-up when the first ambulance was committed for the transport of the MP. Crash personnel extinguished a fire in the tailpipe area of the MA immediately upon arrival at the scene. Simultaneously, rescue personnel arrived and prepared the MP for transport to the hospital (V-10,V-12).

j. Maintenance Documentation: A thorough review of maintenance records for aircraft 89-2093 revealed two discrepancies. The first discrepancy was on the Air Force Technical Order (AFTO) form 781A preprint for Phase 1 & 3 scheduled maintenance. It had incorrect technical order (T.O.) reference for NLG initial servicing (H-11). The preprint referenced T.O. 1F-16CG-2-32JG-10-1. The correct reference was T.O. 1F-16CG-2-32JG-20-1. The second discrepancy was an incorrect T.O. reference in the "Corrective Action" block (H-24) for the replacement of the NLG strut. The reference given was 32JG-40-1 (shortened version of T.O. 1F-16CG-2-32JG-40-1). The correct reference was T.O. 1F-16CG-2-32JG-20-1. Additionally, there was a discrepancy between testimony by 68 FS maintenance personnel (V-15,V-16) and AFTO form 781A (H-30) which documents servicing of the NLG strut. Testimony stated that an initial NLG strut servicing was performed. AFTO form 781A (H-30) depicts that the NLG strut was serviced in accordance with (IAW) T.O. 1F-16CG-2-12JG-00-1, which did not address initial NLG strut servicing. These documentation discrepancies were not factors in this aircraft mishap.

k. Maintenance personnel and supervision: Aircraft 89-2093 received a scheduled Phase 1 inspection prior to the mishap. The NLG strut was replaced during this inspection due to a "gouge" discovered on the cylinder portion of the strut. Initial servicing of the NLG strut was accomplished twice before completing the Phase inspection. The first initial servicing was a standard requirement for this inspection. The second initial servicing was accomplished because the NLG strut appeared to be extended too much, resulting in a higher than normal nose-high stance of the aircraft while resting on the ground (V-15,V-16).

The NLG was overserviced with hydraulic fluid during the Phase 1 maintenance inspection (J-24). Maintenance personnel indicated that the correct T.O.s were available and utilized during the replacement of the NLG strut and during the initial servicings. During both initial servicings of the NLG strut, two maintenance technicians were undergoing training by current and qualified maintenance personnel authorized to conduct this training. All T.O.s were followed during the NLG strut replacement and initial servicings (V-15,V-16,V-37,V-38).

All other servicing, inspections and preparations for flight were completed as per the appropriate T.O.s (V-15,V-16,V-17,V-19,V-33). Training records were thoroughly reviewed and all personnel involved in the Phase maintenance, preflight and launch of the MA were current and qualified (BB-2). Proper supervision was available when all maintenance actions and/or functions were performed on the MA (V-19,V-20,V-33,V-46).

l. Engine, fuel, hydraulic and oil inspection analysis: Technical analysis of the data recovered from the MA's CSFDR and Engine Monitoring System Computer (EMSC) was performed by LMTAS (J-4) and Military Flight Safety, Military Engine Operation, G.E. Aircraft Engines, Evendale Ohio. Analysis of the data indicated that the engine installed in the MA was providing the expected level of thrust, and adequate thrust for flight (J-52-J53). Engine oil analysis records of the MA engine indicated no abnormalities (D-1). Engine operation was not a factor in this mishap.

JP-8 fuel, liquid oxygen and hydraulic fluid samples from the MA were analyzed on 1 Aug 96 (CC-1). Analysis indicated that all samples were normal and were not factors in this mishap.

m. Airframe and aircraft systems: The MA flew two sorties following the replacement and initial servicing(s) of the NLG strut during its Phase 1 inspection. The first sortie was flown in the Moody AFB local area on 26 Jul 96. The aircraft had no reported discrepancies following this sortie. The second sortie was the deployment sortie to Albuquerque IAP on 29 Jul 96. After landing, the pilot reported one discrepancy with the ultra-high frequency (UHF) radio. The "squelch" was reported to be too "high." This discrepancy was corrected that same day (H-63). During the taxi to runway 17 on 31 Jul 96, the MP experienced a unusual indication of "porpoising" as the MA was rolling down the taxiway (V-1). He contacted Lancer 52 to ask him if he had experienced similar indications with his aircraft. Lancer 52 confirmed that his indications were similar, and that the taxiway surface appeared to be "irregular" (V-3). This was the only expressed irregularity with the aircraft that could be indicative of a problem with the NLG strut prior to the mishap.

Following the mishap, the MA NLG strut was returned to Headquarters (HQ) Ogden Air Logistics Center (OO-ALC/LILE), Hill AFB, UT for evaluation. Load pressure testing of the strut found it to be out of limits (J-24). It was determined that the strut had been overserviced with hydraulic fluid by 34.2 cubic inches and contained very little nitrogen. Investigation and testing revealed that with the NLG strut in this overserviced state, it was fully compressed at an "X" dimension of 7.0 inches. This was 4.5 inches higher than normal. The small amount of nitrogen in the NLG strut resulted in a stroke of 5.8 inches. The stroke of a normally serviced NLG strut is 10.3 inches. The short stroke of the overserviced NLG strut could result in a very stiff strut and "bouncy ground maneuvers." A correctly serviced NLG strut for an aircraft with the same weight as the MA would have an "X" dimension of 4.2 inches. Investigation and testing revealed that the "X" dimension on the MA's NLG strut during the attempted takeoff on 31 Jul 96 was approximately 3.0 inches above a normally serviced NLG strut (J-24). A reservicing and a subsequent test of the MA NLG strut followed by teardown analysis indicated that the MA NLG strut was fully functional when it was serviced correctly (J-24). Further investigation and analysis revealed that it is possible for a NLG strut, which is overserviced with hydraulic fluid, to have an "X" dimension within allowable parameters. However, this "X" dimension measurement would only be valid for a single aircraft weight. For example, if a NLG strut were overserviced with hydraulic fluid and then serviced with nitrogen to meet allowable "X" dimension parameters at a certain configuration and fuel weight, and then flown (thus depleting its fuel and reducing its weight), the resultant "X" dimension value would not be within allowable parameters if measured after landing from the flight (JJ-1).

Following the mishap, the 347 FW did a one-time inspection of all assigned F-16 NLG struts to assess their state of servicing (V-13, DD-1). This inspection revealed that 23 of 42 NLG struts were incorrectly serviced. The 347 Logistics Group Quality Services (347 LG/LGQI) section determined, through "hands-on" testing, that the T.O. procedures for initial NLG servicing, while the aircraft was on jacks, were deficient. They have submitted AFTO Form 22 with recommended changes to correct the deficiency in the existing T.O. The 347 LG/LGQI also recommended that NLG strut initial servicing be accomplished every 100 hours rather than at 200 hour Phase inspection intervals (DD-1). These recommendations were implemented (DD-2, DD-3).

The following aircraft components/systems were evaluated by the indicated agencies and were assessed to be operating normally at the time of the mishap:

Component/System	Agency	Reference
Flight Control System (FLCS)	LMTAS	J-11
Air Data System	LMTAS	J-12
Aircraft Brakes	OO-ALC/LILE	J-29
Light Bulb Analysis	OO-ALC/LIINT	J-32
Airspeed/Mach Indicator (AMI)	Sacramento Air Logistics Center/TIELO/TIMSNC/ LIAFE/LICL	J-37
Side Stick Controller (SSC)	Lear Astronics Corporation	J-47
Brake Valve Assembly	OO-ALC	J-70
Brake Control Box	OO-ALC/LILEC	J-72
Anti-Skid Control Box	OO-ALC/LILEC	J-72
Right and Left hand Wheel Speed Sensor	OO-ALC/LILEC	J-72

n. Operations personnel and supervision: The mission was authorized by the 347 FW and 68 FS. Capt Middleton, 68 FS Flight Commander, gave the flight briefing IAW MCI 11-F16, Volume 3. Other members of the flight included: Chief of Wing Safety (Lancer 52) and Squadron Standardization and Evaluation Flight Examiner (Lancer 54) (V-1,V-2,V-3,V-4). The flight briefing was generally thorough. However, the briefing did not include specific reference to the requirement for the BAK-14 arresting cable to be raised for all takeoffs and landings IAW MCI 11-F16, Volume 3. Additionally, none of the deployed 68 FS pilots were aware of this requirement prior to the mishap (V-1,V-2,V-3,V-4,V-22,V-23,V-24,V-25,V-26,V-27). Operations tempo for the period from Jan 96 until the mishap was very high. During this time period, the 68 FS deployment and exercise schedule included: Red Flag Exercise, 19 Jan-4 Feb 96; two Phase I Operational Readiness Exercises, 23-25 Jan 96 and 19-21 Feb 96; Operation STANDBY, 2-10 Mar 96; Air Expedionary Force (AEF) deployment to Jordan, 10 Apr-30 Jun 96; and a Phase I Operational Readiness Inspection (ORI), 21-26 Jun 96 (LL-1).

o. Pilot Qualifications: Capt Parsons was current and fully qualified to perform the scheduled mission (T-1 through T-2). His flying experience is as follows (G-1 through G-2):

T-38A	1.0 hours
OV-10	845.1
AT-38B	99.2
F-16A/B	1.2
F-16C/D	842.1
TOTAL	1788.6

HOURS/SORTIES 30 days / 60 days / 90 days

30 days	60 days	90 days
7.1/4	32.6/18	68.1/38

p. Medical: Capt Parsons was medically qualified for flying duties (X-1). Toxicology specimens taken immediately following the mishap were analyzed and contained no alcohol, elevated carbon monoxide levels or illegal substances (X-2).

q. Navigational aids (NAVAIDS) and facilities: All applicable NAVAIDS were in operation (EE-1).

r. Weather: The last weather observation by the National Weather Service Forecast Office, Albuquerque IAP on 31 Jul 96 at 1258 hours MDT was: 7,000 few, 12,000 scattered, 25,000 scattered, visibility 10 miles, temperature 32 degrees Celsius, dew point 9 degrees Celsius, winds 240 degrees / 11 gusting to 14 knots, altimeter setting 30.18 inches (W-1).

s. Directives and publications: Applicable operations and maintenance publications and directives were:

Multi-Command Instruction (MCI) 11-F16, Volume 3, Pilot Operational Procedures F-16
MCI 11-F-16, Volume 3, 150 FW Supplement 1, Chapter 8 - Local Operating Procedures
T.O. 1F-16CG-1, Flight Manual
T.O. 1F-16CG-1CL-1, Flight Manual Checklist
T.O. 1F-16CG-2-12JG-00-1, Job Guide Servicing
T.O. 1F-16CG-2-32JG-00-1, Job Guide Landing Gear
T.O. 1F-16CG-2-32JG-10-1, Job Guide Main Landing Gear and Doors
T.O. 1F-16CG-2-32JG-20-1, Job Guide Nose Landing Gear and Door
T.O. 1F-16CG-2-32JG-40-1, Job Guide Landing Gear Wheels and Brakes
T.O. 1F-16CG-6WC-1-11, Work Cards for Combined Preflight/Postflight, End of Runway, Thruflight, Launching and Recovery, Quick

Turnaround, Basic Postflight, and Walk Around Before First Flight of the Day Inspections

Note: Workcards (WC) are used for inspections (i.e. what to look for). Job Guides (JG) are used to direct maintenance actions (how to fix it).

Deviations from directives and publications were:

MCI 11-F16, Volume 3, Chapter 3, Section 3.6 Takeoff, Para 3.6.4 (FF-1). Mishap flight did not ensure BAK-14 departure end arresting cable was raised for takeoff.

Observations about other applicable operations and maintenance publications and directives were:

MCI 11-F16, Volume 3, 150 FW Supplement 1, Chapter 8, Section 8.16, Para 8.16.2 (FF-2). "Runway 17/35 is usable for takeoff and landing. For runway 17 departures, flight leaders should request the BAK-14 at the departure end be raised." This statement conflicts with Para 8.16.6 (FF-2), which states that, "Normally, the BAK-14 on runway 17 will be raised for emergencies only."

MICHAEL J. QUINLAN, Lt Col, USAF
AFI 51-503 Aircraft Accident Investigating Officer

OPINION AS TO THE CAUSE OF THE ACCIDENT: Under 10 U.S.C. 2254(d), any opinion of the accident investigators as to the cause or causes of, or the factors contributing to, the accident set forth in the accident investigation report may not be considered as evidence in any civil or criminal proceeding arising from an aircraft accident, nor may such information be considered an admission of liability by the United States or by any person referred to in those conclusions or statements." Based upon the evidence, which I found to be clear and convincing, the causes of the accident involving the F-16 aircraft, number 89-2093 were supervisor error, pilot error and deficient F-16 aircraft maintenance technical data.

a. The 68th FS supervisors did not ensure that all critical operating procedures for runway arresting systems at Albuquerque IAP were known and understood by the squadron pilots prior to the QF 96 deployment.

b. 100% of the 68th FS pilots deployed for QF 96 were unaware of the requirements regarding use of aircraft arresting systems during takeoffs and landings as per MCI 11-F16, Volume 3. This lack of knowledge led to the inadvertent deviation from this directive and resulted in the failed high speed abort of the MA.

c. Witness testimony stated that procedures outlined in T.O. 1F-16CG-2-32JG-20-1, Job Guide Nose Landing Gear and Door, allowed the NLG strut to be overserviced with hydraulic fluid. 347 FW maintenance personnel were able to duplicate the overserviced condition using the established procedures. Detailed analysis of the strut confirmed that it had been overserviced. Although the aircraft flew two previous sorties without incident, the overserviced strut failed to function as designed during the takeoff phase of the MA on 31 Jul 96. The resulting failure of the MA to rotate at the precomputed rotation speed, as well as the MP's perception that the aircraft would not rotate, understandably prompted him to attempt a high speed abort.

There were also significant contributing factors to this accident.

a. After deciding to abort his takeoff, the MP's first radio transmissions to Albuquerque Tower requesting the BAK-14 to be raised were "stepped on" by other Albuquerque Tower radio frequency traffic. Comparison of the data retrieved from the CSFDR and the recorded Albuquerque Tower radio frequency transmissions indicated that, had this not occurred, the initial radio transmissions by the MP probably would have been heard by the tower personnel, and they would have initiated action to raise the runway 17 cable in time for a successful cable engagement by the MA.

b. A less tangible but equally important factor was the recent operations tempo of the 68 FS. Successive deployments for the 68 FS, since Jan 96 and prior to the QF 96 deployment, included a Red Flag Exercise, two Phase I OREs, an Operation STANBY deployment, participation in an AEF deployment to SWA, and a supporting role in a wing Phase One ORI. Combined with this robust exercise and deployment schedule was the everyday training demand while "in garrison" at Moody. To meet the normal sortie generation contract, the 347 FW units were required to "surge" schedule two weeks each

month. All of these requirements clearly indicated that the 347 FW and the 68 FS squadron were heavily tasked with operational commitments on a continual basis since Jan 96. The pace and volume of activity required to meet these commitments directly affected the attention-to-detail in the planning for the QF 96 exercise, as well as each pilot's personal preparation for this deployment.

MICHAEL J. QUINLAN, Lt Col, USAF
AFI 51-503 Aircraft Accident Investigating Officer

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh No 216
In the matter of PFS
Staff _____ IDENTIFIED ✓
Applicant ✓ RECEIVED ✓
_____ REJECTED _____
_____
Contractor _____ DATE 7/6/00
Other _____ Witness _____
Reporter Ead