SECTION M - NARRATIVE DESCRIPTION

1. HISTORY OF FLIGHT.

a. The aircraft departed Burbank, California, at 0658 Pacific Standard Time (PST) as a Military Air Transport Service (MATS) scheduled transport flight for Watertown Airport in the Nevada Proving Ground area with an estimated time enroute of one hour and fifty minutes. The flight was filed with the Civil Aeronautics Administration (CAA) and cleared Instrument Flight Rules (IFR) 1000 feet on top via airways Amber 1, Green 4 and Amber 2 to the Goodsprings, Nevada, homer and Visual Flight Rules (VFR) from Goodsprings direct to the Watertown Airport. The aircraft made an instrument climb out on the southeast course of the Burbank low frequency range, reported over the Burbank range at 0712 PST at 9100 feet and 1000 feet on top. Other enroute position report times were the Newhall range at 0720 PST, the Palmdale range at 0728 PST and the Daggett range at 0744 PST. The aircraft's last radio contact was at 0809 PST to the Las Vegas Interstate Airway Communications Station (INSAC) giving a position report indicating the aircraft was over the Goodsprings homer at 0808 PST at an altitude of 1000 on top and cancelling the IFR clearance. The aircraft had eight hours fuel on board. The alternate used was Las Vegas, Nevada. The aircraft crashed into Mount Charleston at 0819 PST after being airborne for one hour and twenty-one minutes.

SECTION M - NARRATIVE DESCRIPTION

2. INVESTIGATION AND ANALYSIS.

a. The aircraft initially struck approximately 50 feet below the crest of an 11,300 foot ridge while on a magnetic heading of 240 degrees. Examination of impact marks revealed that the aircraft was in a steep climb attitude with wings level at the time of impact. The aircraft momentarily contacted the ground and continued airborne approximately 60 feet to the second point of impact and slid 20 feet, coming to rest where it burned. With the exception of a few small items which were thrown approximately 100 feet forward of the aircraft, most of the wreckage remained within 50 feet of the aircraft.

b. The right wing was intact and only slightly burned. The left wing was separated from the aircraft at the wing root, with further separations between the engine nacelles and at the juncture of the outboard panel. All trim tabs were set for normal flight. Examination of wing flaps and the left flap actuator indicated that the wing flaps were extended approximately 10 degrees and in symmetry at the time of impact. The wing flap control lever and position indicator were not found. The use of 10 degrees wing flaps is a normal C-54 configuration for making an instrument approach and letdown. All landing gear were retracted.

c. Engines Nr 2, 3 and 4 had separated from their nacelles and Nr 1 engine was partially separated. Visual examination of the engines did not indicate malfunction prior to impact. All four propellers were found separated from the engines and examination indicated a high power, high revolutions per minute (RPM) condition at the time of impact. The tachometer for engines Nr 3 and 4 indicated 2450 RPM at impact. All other flight and engine instruments found did not reveal reliable information.

d. A review of the Aircraft Maintenance Records available revealed no contributing causes to the accident. The Aircraft Flight Report and Maintenance Record, DD Forms 781 processed since 11 November 1955 were destroyed in the crash. Questioning of the pre-flight and post-flight maintenance personnel at the Burbank Airport concerning the discrepancies and malfunctions reported since 11 November 1955 revealed no contributing causes to the accident. The 62d periodic inspection was completed on 11 November 1955. The aircraft had completed an 100H inspection by Lockheed Air Service on 4 October 1955 and had flown 213:40 since that date. Eleven technical orders were not complied with; however, non-compliance with these technical orders was not considered a contributing factor to the accident.

e. A review of the training records revealed the air crew to be highly experienced. The pilot graduated from flying school in September 1950 and had flown a total of 3162 hours of which 1383 hours were in C-54 type aircraft. He graduated from C-54 pilot training in June 1954, and successfully passed a flight examination as a MATS C-54 aircraft commander in November 1954. His last proficiency flight check was in August 1955. His latest MATS route flight check was on 14 November 1955 from Kelly AFB, Texas, to Burbank, California. Instructor pilot comments on all flights indicated an above average pilot. He had a green instrument card which would have expired 9 August 1956. The copilot graduated from flying school on 14 April 1955. He had accumulated a total of 682 hours with 409 hours in C-54's. He was a MATS qualified C-54 second pilot. His flight training records showed satisfactory performance for his experience and qualifications. The flight engineer had flown a total of 3041 hours. He had been a C-54 flight mechanic technician since 1 December 1953. He was designated an Instructor Flight Mechanic technician in April 1955. All flight records indicated an above average experience level. Investigation of the crew assignment procedures indicated that the crew was carefully selected for this mission and that they had been an integral crew since the start of the mission. The fatal flight would have been the 18th round trip on this route within the past 30 days for the crew. The route briefing for the mission was at Headquarters, USAF. A route flight check as required by MATS Manual 55-1 was not accomplished for the specific route. An officer assigned to this project from Headquarters, USAF, Washington, D. C., stated that he made the first trip with each crew for pilot familiarization only. A written record to indicate the degree of qualification was not in evidence.

f. Examination of the Aircrew Standing Operating Procedure (SOP) established for this flight revealed limited operational control. The SOP did not carry an organizational heading; it was neither dated nor signed. The SOP stated that the aircraft and air crew were under the operational control of the Commander, Watertown Airstrip. The SOP provided that an Atomic Energy Commission (AEC) security officer would establish the destination in event of bad weather. The SOP further stated that the MATS aircraft commander would have complete responsibility for safety in flight and that he would "make the final decision whether or not the flight will go." He would also have the responsibility for compliance with all Air Force Regulations.

g. Examination of the clearance for this flight revealed non-compliance with paragraph 37d, Air Force Regulation 60-16, dated 13 February 1953. This paragraph provides for an instrument clearance to a destination without an instrument approach procedure only when a pilot can clear IFR to a point of letdown which has an instrument approach procedure and then proceed to his destination without an instrument approach procedure under VFR conditions. This flight was filed and

cleared by the CAA, IFR via airways to the Goodsprings, Nevada homer and then VFR direct to destination. Goodsprings does not have a published letdown, airport nor weather station. The Aircrew SOP for this operation provides for a route procedure of IFR via airways from Burbank, California, to the Las Vegas, Nevada, Radio Range Station and VFR direct to destination. Representatives of the Watertown Commander indicated that the route change was authorized by the Watertown Base Commander. Reasons given were to save approximately ten minutes flying time and to avoid flying through the high density Nellis AFB-Indian Springs AFB jet aircraft traffic.

h. Examination of the flight planning forms revealed certain discrepancies. USAF message Nr AFOOP-OC-FL 360/55 to all major commands on 27 January 1955, a revision to conflicting regulations, required that a DD Form 175 aircraft clearance form be completed and filed for all flights from bases without a military base operations. The Aircrew SOP for the Burbank to Watertown flight stated that normal aircraft clearance procedures would be used, yet the same SOP specifically provided for a procedure to activate a CAA master flight plan by telephone or radio to the Burbank radio range station. That flight plan, as well as others on the same project, was filed by telephone to the Burbank CAA office using the CAA Flight Plan form. A completed DD Form 175 was not left with appropriate personnel at Burbank. The cargo and passenger manifests were not standard military forms. The cargo manifest used was dated 11 November 1955 and indicated 1182 pounds of cargo; however, the DD Form 365F, Aircraft Weight and Balance, indicated 1075 pounds of cargo. The passenger weights on the DD Form 365F indicated six passengers in C and D compartments at 200 pounds each, while four passengers were listed in E compartment at 100 pounds each. It was further noted that the Weight and Balance Form indicated 2200 gallons of fuel for takeoff condition which would be approximately eleven (11) hours of fuel, whereas the CAA clearance indicated eight (8) hours of fuel aboard. The aircraft reported over Burbank range at 0712 PST at an altitude of 9100 feet and 1000 on top after an instrument climb out on the southeast course of the Burbank low frequency range. No other altitude was given in four other position reports on the flight other than 1000 feet on top.

i. Investigation of the clearance procedures did not reveal that a weather briefing was given to the pilot prior to takeoff. The Aircrew SOP for this operation provided for the weather information to be secured by telephone from the CAA Weather Office at Burbank. The pilot of another crew assigned to the mission stated that they were briefed not to use their actual destination area but to use Las Vegas as a weather destination in requesting weather information. A master CAA flight plan, Department of Commerce - CAA Form ACA-398, which was listed as Master Nr 1 for another aircraft, as well as this aircraft, carried an annotation in the remarks section "NX CHKD BY PILOT". USAF message AFOOP-OC-FL, All Major Commands 992-54, dated 5 October 1954,

states that pending revision of AFR 60-11, use of the phrase "Weather Checked by Pilot" is no longer authorized. The Burbank CAA weather office does not record weather briefings nor did any of the weather personnel recall giving a briefing for C-54 SN 44-9068 on its intended route on 17 November 1955. The general weather situation for the period of the flight indicated that a change from IFR to VFR at the Goodsprings, Nevada homer was unlikely for flights at altitudes at or above the minimum enroute altitude of 9500 feet. The surface weather charts portrayed an occluded front extending southwestward from a low pressure area centered over Nellis AFB, Nevada. With the frontal system there was an extended weather pattern with considerable snow to the north. Analysis of weather charts and pilot reports indicates the existence of "sucker holes" in the broken ceilings reported at about the time of the accident. The "sucker holes" were rapidly changing openings in the clouds on the lee side of the mountains. Since the pilot cancelled his IFR clearance over Goodsprings homer, it is considered likely that he tried to descend through such an opening only to find himself suddenly engulfed in clouds. Snow showers were reported in the Charleston Peak area and witnesses located just to the east of the crash site reported observing a four-engine aircraft flying on a westerly heading through a brief break in the clouds at approximately the time of the accident. It would appear that had a complete weather briefing been given to the pilot, in all probability a flight plan would not have been filed involving a change from IFR to VFR at the Goodsprings, Nevada, homer.

j. Analysis of the flight plan and the most probable intended route from the Goodsprings homer indicates that the aircraft might have drifted off course and/or the pilot became disoriented. An interview with representatives of the Watertown Command and with the pilot of the other crew assigned to the mission revealed that the route normally flown was along the west side of the Spring Mountain range on a magnetic course of about 312 degrees. Based on the flight plan true airspeed of 175 knots and the actual ground speed of 225 knots between the Daggett radio range station and the Goodsprings homer, a tailwind component of 50 knots existed. The 0100 winds aloft charts 17 November 1955 indicated a 35 knot wind from 200 degrees at 10,000 feet mean sea level (MSL). The higher winds encountered are attributed to the occluded front which lay along the route from Burbank to Goodsprings. Computations for drift correction to make good the magnetic course of 312 degrees reveal an 18 degree wind correction angle based on computed winds compared to a nine degree wind correction based on winds aloft charts. Comparison of the most probable intended route and the most probable flight path approximates the difference in computed wind correction angles. From the above, it is reasonable to assume that the heading taken by the aircraft from Goodsprings resulted in a track to the east of the mountain range and was unknown to the pilot. It seems probable that the pilot on encountering lowering visibility and ceiling, turned to the left to fly away from the higher terrain, which caused the aircraft to be flown into the higher mountains. It is also probable that the ceiling and visibility was even lower in the immediate vicinity of the higher mountains.

k. There exists the possibility that the aircraft may have become involved in extreme downdrafts on the lee side of the mountain. The crash heading of 240° magnetic and the statement of witnesses, who probably saw the aircraft, indicate the flight path to be upwind. The 60 knot velocity of the computed wind on the 40° or more mountainous slopes could cause downdrafts that would exceed the climb capabilities of C-54 aircraft. The high power setting and the probability of a high angle of attack on impact, indicates an attempt to nullify a downdraft condition. The aircraft wing flap setting of 10° would not be used in a climb configuration, except as a last resort for clearing an obstacle.

l. Examination of the action used by the Watertown Operations Officer to divert the aircraft to Nellis AFB revealed a questionable procedure. Two contacts were made to the operations dispatcher at Nellis AFB; one to request if Nellis had any information on C-54, SN 54-9068, and the second to have the Nellis tower contact the aircraft for a landing at Nellis AFB due to weather at Watertown. Since it was not required for the aircraft to establish contact with the Nellis AFB tower and since the aircraft was under Air Route Traffic Control (ARTC) jurisdiction for most of the flight, contact with other agencies would have been more appropriate. The March Flight Service Center has a direct line to Watertown Operations. With the Center's ability to immediately contact ARTC as well as military air traffic controllers, that channel would have provided a faster and more reliable facility for aircraft control. Indications were that there was not an established procedure at the Watertown Airport governing the control of aircraft and that necessary actions were those determined by the operations officer on duty.

m. Examination of the CAA and Flight Service Center records revealed an error in takeoff time that may have caused a delay in action to divert the aircraft by the Watertown Operations Office. The flight strip log on file in the Burbank Control Tower indicated a takeoff time of 0658 PST. A departure message received by March Flight Service from the Burbank RCAG Station indicated a takeoff time of 0725 PST with one hour and fifty minutes enroute. The erroneous takeoff time with other information was relayed to the Watertown airstrip at 0747 PST. A statement and interview with the Watertown Operations officer did not indicate immediate action concerning the inbound aircraft, probably because the Estimated Time of Arrival (ETA) was still about one and one-half hours away. At some time between 0800 and 0830 PST (approximately) the Watertown Operations Officer telephoned the Nellis AFB weather forecaster to evaluate the area weather, which portrayed that flight from Goodsprings to Watertown was possible under VFR. At 0840 PST (approximately) the Watertown Operations Officer requested the Nellis AFB operations dispatcher to determine if the C-54 had been heard from in the Las Vegas area and received a negative report. At 0850 PST (approximately) the Operations Officer requested the Nellis AFB operations dispatcher to have the C-54, SN 54-9068, land at Nellis AFB because of instrument conditions at Watertown due to low ceilings and visibilities in snow showers. Had the correct ETA of 0848 PST been forwarded to Watertown, faster action might have been taken to divert the aircraft to another destination.

Contradictory

SECTION II - NARRATIVE DESCRIPTION

3. FINDINGS.

a. The findings of the accident investigation were that:

(1) The flight crew was qualified to perform the mission attempted.

(2) There was not a record of the crew receiving a weather briefing except an annotation on the Master CAA flight plan "WX Checked by Pilot," which is unauthorized by USAF All Major Commands Message AFOOP-OC-FL 992-54, dated 5 October 1954.

(3) A DD Form 175 was not filed as required by USAF All Major Commands Message AFOOP-OC-FL 360-55, dated 27 January 1955.

(4) The CAA transmitted to the March Flight Service Center an erroneous takeoff time.

(5) There were minor errors in the weight and balance forms of passenger weights, cargo weights and fuel on board. These errors did not contribute to the accident.

(6) The activities of the crew during crew rest period prior to the flight could not be determined.

(7) There were no outstanding mechanical discrepancies on the aircraft prior to this flight that would contribute to the accident.

(8) The flight was normal to the Goodsprings homer when the last radio contact was made.

(9) The aircraft crashed on a magnetic heading of 210° at an altitude of 11,300 feet.

(10) The wing flaps at impact were extended approximately ten degrees.

(11) The use of Goodsprings, Nevada, homer as the termination point for an IFR flight does not comply with paragraph 37d, AFR 60-16.

b. In view of the findings listed in paragraph 3a above and the analysis made during the investigation, it was concluded that:

(1) The most probable cause of the accident was a navigation error by the pilot while attempting to navigate the aircraft through mountainous terrain under VFR during IFR weather conditions.

(2) A contributing cause of the accident was the supervisory error in establishing the IFR termination point at the Goodsprings homer instead of Las Vegas radio range station in violation of paragraph 37d, AFR 60-16.

(3) A contributing cause factor was the CAA error in time of takeoff that was given to Flight Service which established an ETA twenty-seven minutes later than actual and delayed aircraft diverting action.

(4) Procedures used by the operations officer of the destination airport to divert the aircraft were unsatisfactory in that proper aircraft control agencies were not utilized.

(5) Lack of adherence to directives pertaining to aircraft clearance and the discrepancies in the forms utilized in clearing the aircraft indicate sub-standard operation.

(6) The weather briefing procedure was inadequate in that the destination used to obtain weather information was a considerable distance from actual destination.

(7) The operational control exercised for the flight did not meet MATS requirements for a scheduled Air Transport Mission as established in MATS Manual 55-1.

SECTION M - NARRATIVE DESCRIPTION

4. RECOMMENDATIONS.

a. It is recommended that:

(1) A flight service circuit (Plan 62) be installed between the Burbank Airport and the March Flight Service Center to facilitate clearances of military aircraft.

(2) All flights comply with the All Major Commands Message AFOOP-OC-FL 360-55, dated 27 January 1955, which provides for the submission of a DD Form 175 for aircraft departures.

(3) Instrument clearances be filed to a point with an approved letdown as specified in paragraph 37d, AFR 60-16.

(4) Pilots comply with the provision of All Major Commands Message AFOOP-OC-FL 992-54, dated 5 October 1954, which prohibits the use of the phrase "Weather Checked by Pilot."

(5) Appropriate agencies establish procedures to insure adequate operational control of aircraft operating into the Watertown Airstrip.

Review of the Historical Records of C-54[illegible], Serial No. 44-9068A revealed the following Technical Orders were not complied with.

1. T. O. 1C-54-201 NCW - Installation of external handle of auxiliary exit.

2. T. O. 1C-54-208 NCW - Installation of pressure restriction elbow in main hydraulic system.

3. T. O. 12P4-2APX6-503 NCW - Realign. proc. to effect change of initial operating frequency in the AN/APX6 radar set.

4. T. O. 1235-2APN1A-504 NCW - Replacement of brushes in dynamotor assy DY66J/APN1A.

5. T. O. 12P5-2APN1-504 NCW - Installation of Bonding straps in Trans. receiver RT-7/APN-1.

6. T. O. 2RA7-2-13 NCW - Mod. of exhaust manifold assy on V32-D-2 & D-2-1 APU.

7. T. O. 2RA7-2-501 NCW - Repl. of fuel pump assy on V32-D-2 & D-2-1 APU.

8. T. O. 12P2-2AIC/3-502 NCW - Mod of Contr. Box C-166/AIC-3-AN/AIC-3.

9. T. O. 3-1-502 and 502E NCW - Paint removal and inspection of propeller blades.

10. T. O. 1C-54M-202 NCW - Modification of passenger oxygen outlets.

11. T. O. 1C-54[illegible]-205 NCW - Replacement of Lock Switch Automatic Disinsection System.

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SPECIAL HANDLING REQUIRED
IAW PROVISIONS PARA [illegible] and 32 AFR 62-14

SEC V, AF Form 14 LIST OF PASSENGERS

DUTY	NAME	ASSIGNMENT	INJURY	PARACHUTE USED
Pass	Gray, James F., Civilian	Unknown	Fatal	No
Pass	Brown, James W., Civilian	Unknown	Fatal	No
Pass	Hanks, Fred P., Civilian	Unknown	Fatal	No
Pass	Hruda, Richard J., Civilian	Unknown	Fatal	No
Pass	Kreimendahl, Rodney K., Civ.	Unknown	Fatal	No
Pass	Marr, William W. Jr., Civilian	Unknown	Fatal	No
Pass	O'Donnell, Terence J., Civilian	Unknown	Fatal	No
Pass	Silant, Harold C., Civilian	Unknown	Fatal	No
Pass	Skrolatis, Edwin J., Civilian	Unknown	Fatal	No
Pass	Gaines, John H., AF, S/SGT AF 25285551	Unknown	Fatal	No

10

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