NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D. C. 20594

September 16, 1999

AIR TRAFFIC CONTROL GROUP CHAIRMAN'S

FACTUAL REPORT OF INVESTIGATION

A. ACCIDENT

A.	Airplane:	N79NL, a Cessna P210N
B.	Date:	January 20, 1999
C.	Time:	1528 MST (2228 UTC)[1]
D.	Location:	Albuquerque, New Mexico
E.	NTSB No:	DEN-99-FA-034

B. AIR TRAFFIC CONTROL GROUP

Richard J. Wentworth, Chairman	NTSB, AS-30 Washington, D. C.
Alan Neace, Member	NATCA Fort Worth ARTC Center Southwest Region Fort Worth, Texas
Jeffrey M. Rich, Member	FAA, AAI-100 Washington, D. C.

[1] All times will be shown in local time based on the 24-hour clock with the exception of those times shown in "History of Flight" which will be shown in Universal Coordinated Time (UTC) or unless indicated otherwise.

C. SUMMARY

On January 20, 1999, at 1528 Mountain Standard Time, a Cessna P210N, N79NL, was destroyed when it broke up in flight and collided with terrain in the Sandia Mountain Wilderness Area, near Albuquerque, New Mexico. The instrument rated private pilot and two passengers were fatally injured. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the personal flight being conducted under Title 14, CFR Part 91. The flight originated in Scottsdale, Arizona at 1343 PST.

The flight was initially was being provided radar services by controllers at the Albuquerque Air Route Traffic Control Center (ARTCC), and was later given a radio frequency change to the Albuquerque Terminal Radar Approach Control (TRACON). Recorded voice communications indicate that the pilot was at flight level 230 when he told the controller at the Albuquerque Center that he had experienced a dual vacuum pump failure. He advised the controller that he needed to descend to get below the base of the clouds and was issued an altitude of 14,000 feet. During the descent, he advised the controllers that he may have been in a spin and was advised to contact approach control.

After making contact with Albuquerque approach, the pilot advised that he may have just rolled the airplane and that he needed assistance. He also stated the airplane was equipped with an electric artificial horizon and compass backup, but that they did not agree. Shortly thereafter, radio and radar contact was lost.

D. DETAILS OF THE INVESTIGATION

1. History of Flight

After departing Scottsdale, Arizona all air traffic control services had been routine and uneventful. However, at 2219:10, the radar controller at the R-17 sector inquired, "and november seven nine november lima verify you're level at two three zero showing you four hundred feet low." At 2219:14, the pilot replied, "uh nine november lima we've just figured out that we've had a dual vacuum pump failure we've uh we've lost both our vacuum pumps uh so we're gonna need to look for uh someplace we've got electric uh back up systems here but we uh we're having a little trouble holding altitude and everything. The R-17 controller responded, "okay let me know if you need any uh assistance." At 2219:35, the pilot inquired, "uh nine november lima uh how uh what's the bottom of the cloud layer we're we're i-f-r at this time." During this period, an adjacent sector controller, having heard these transmissions, advised the R-17 controller, "and when he loses he loses his vacuum pumps.... he's basically just blind

up there so the sooner you can get him down the better off he is." The R-17 controller replied, "oh okay thanks I didn't know that."

After being advised that the cloud bases were between twelve to thirteen thousand feet, she then asked the pilot of N79NL if he wished to, "start down" (descend). At 2220:30, the pilot stated, "nine november lima we'd like to start down well what are the bases." The R-17 controller replied, "uh they said around thirteen." At 2220:35, the pilot responded, "nine november lima we'd like to start down and get below the bases." At 2220:38, the R-17 controller transmitted, "november seven n8ine november lima roger descend and maintain uh one four fourteen thousand." The pilot acknowledged the clearance. At 2220:48, the radar controller coordinated the flight through the north airspace of approach control by advising, "yeah I've got uh an aircraft out there about seven northeast of the v-o-r his code is zero seven zero four he's at flight level two three zero needs to descend down to fourteen I guess he lost his vacuum pumps or whatever." The north radar approach controller approved the descent.

At 2221:47, the R-17 controller inquired, "november seven nine november lima are you gonna continue on to Wichita or you wanna uh land early." At 2221:51, the pilot advised, "nine november lima we're gonna want to land early." At 2221:55, the R-17 controller responded, "okay at Albuquerque." The pilot then replied, "uh negative if we can get down below the cloud layer we'd like to get to Liberal Kansas if we could." The R-17 controller transmitted, "okay very good keep me advised thank you." The pilot responded, "nine november lima thanks for the help." While working other traffic, the radar associate (RA-17) controller, who was assisting the R-17 controller, called the next sector that would be working the airplane to advise, "he said if he can get below the clouds he'll go on to Liberal so he's heading down to get below the clouds now." The R-16 controller inquired, "okay he still hasn't figured out what's wrong though huh." The associate controller replied, "he has." The R-16 controller replied, "his vacuum cleaners broke." The associate at RA17 replied, "vacuum tube lossage." And after the R-16 controller repeated what was heard, the associate replied, "yes both of them." The R16 controller replied, "thank you." At 2224:16, the R-17 controller transmitted, "november seven nine november lima contact Albuquerque Center on one three two point eight he'll have lower for you shortly and uh just keep him advised if you need any uh if you need any uh further assistance." The pilot did not respond. At 2224:33, the R-17 controller transmitted, "november seven nine november lima Albuquerque." At 2224:35, the pilot transmitted, "nine november lima we're having' trouble I think we're in a spin." At 2224:50, the pilot transmitted, "nine november lima we're back with you."

While the R-17 controller initiated an interphone call to north approach controller, the RA-17 controller transmitted to the pilot, "nine november lima roger are you gonna want to land at Albuquerque then." The R-17 controller the called the north radar controller at Albuquerque approach and at 2224:57 advised, "yeah that seven nine november lima that we pointed out to you descending to fourteen he needs to land now he said he's in a spin I think he might have it under control so uh he wants vectors into the airport you want me to put him on you or you want me to give him a certain heading." During the above conversation, the pilot was advising the RA-17 controller, "uh that's affirmative we need vectors to Albuquerque." The RA-17 controller then inquired, "and nine november lima what's your altitude now." On the interphone, the approach controller was advising the R-17 controller, "uh just put him on a uh two sixty

heading and a (unintelligible)". The R-17 controller replied, "your control." The RA-17 controller continued to talk to the pilot of N79NL who advised her, "nine november lima we're indicating one eight thousand." At 2225:17, the RA-17 controller transmitted, "november uh nine november lima roger fly heading two six zero and contact approach on one two seven point four." The pilot acknowledged the frequency change at 2225:26.

At 2225:44, the pilot of N79NL made initial radio contact with the north approach controller at Albuquerque. Hearing no response, the pilot made another call at 2225:52 to inquire, "...how do you hear." At 2225:55, the approach controller transmitted, "centurion uh calling approach uh say again your call sign seven niner what." At 2225:59, the pilot transmitted, "seven nine november lima Albuquerque approach." At 2226:02, the controller replied, "seven niner november lima verify at uh one seven thousand six hundred." At 2226:06, the pilot replied, "uh that's affirmative uh nine november lima we've lost both our vacuum pumps and uh I think we just went through a uh a a roll uh we're we've got electric driven backup systems uh electric horizon electric uh compass and they're not uh agreeing with each other at this time so we're gonna need some help."

At 2226:25, the approach controller replied, "sierra five echo romeo roger uh you're uh stable there at uh one seven thousand four hundred." At 2226:32, the pilot responded, "negative nine november lima we're uh not necessarily stable." At 2226:32 the controller transmitted, "roger uh can you accept uh....uh just uh standard right turns for the uh vectors." At 2226:48, the pilot replied, "Nine november lima we're gonna need some help." At 2226:55, the controller transmitted, "november niner november lima radar uh the altimeters uh two niner eight six and it appears you're northwest bound at this time." At 2227:07, the pilot transmitted, "we're at one four thousand four hundred uh nine november lima." At 2227:12, the controller replied, "november niner november lima roger and uh if you can just uh turn right standard turn to the uh right." At 2227:20, the pilot transmitted, "nine november lima we're we're going down we're dead." There was no immediate response from the controller. At 227:50, the controller transmitted, "november seven niner november lima ident." At 2228:24, the controller transmitted, "november seven niner november lima radar contact lost." From 228:56 until 2229:48, the radar controller attempted four calls to the airplane without a response. At 22231:14, a position relief briefing was recorded.

2. Air Traffic Control facilities

The Albuquerque Center is a Level III air traffic control facility. It is operational 24-hours a day. The facility's traffic count for CY 1996 was 1,496,467 compared to 1,484,177 for the previous calendar year, a 0.8 percent increase.

The pilot of N79NL made initial radio contact with sector 38. The flight was later instructed to contact sector 17. This is the en route sector that eventually handed the flight off to Albuquerque TRACON.

3. Equipment Certifications

There were no equipment certifications conducted by either air traffic control facility. A review of FAA Form 7230-4 for both the Center and the TRACON did not disclose any outages that would have been a factor in the accident.

4. Weather

The weather as reported at Albuquerque at 1536 local time was:

Ceiling 5,500 broken, visibility 10 miles, temperature 57, dew point 34, wind 270 at 15, gust to 23, altimeter 29.86. Precipitation was also reported.

5. Controller Information

Albuquerque ARTCC

Susan E. Anderson		R-17 controller
	EOD FAA:	12/04/89
	EOD ZAB:	02/27/90
	Certification north area:	12/11/92
	AT Bulletin	03/01/99
	Over the shoulder R/D-17 Satisfactory	12/01/98
	Over the shoulder r/D-16	11/12/98
	Lost aircraft orientation:	11/12/98
	Tape talk:	11/11/98
	MSAW:	03/28/98
Kathleen Gallagher		AR-17 controller
	EOD FAA:	11/08/88
	EOD ZAB:	01/17/89
	Certification north area:	10/25/91

Tape talk:	02/20/99
Over the shoulder R-17 satisfactory	02/06/99
Air Traffic Bulletin	10/21/98
Lost aircraft orientation:	11/27/98
MSAW:	04/03/98

William D. Bryan — Area Supervisor

EOD FAA:	12/17/73
EOD ZAB:	12/17/73
North area certification:	07/17/76
Northwest area certification:	03/19/86
North area certification:	09/20/95
Tape talk:	10/08/98
Over the shoulder D-17 satisfactory:	06/30/98
Lost aircraft:	11/30/98

Albuquerque TRACON

John M. Riley — Approach controller

EOD FAA:	03/01/89
Monroe, Louisiana TRACAB	06/19/89
El Paso ATCT	05/28/95
EOD ABQ:	05/24/98
CTO issued:	11/29/89
Facility rated at ABQ:	10/30/98
Air Traffic Bulletin	09/29/98

Seldom used procedures	09/08/98
Lost aircraft orientation	02/03/98

Janet G. Gordon	TRACON supervisor
EOD FAA:	06/18/82
Texarkana ATCT	06/18/82
Shreveport RAPCON/Tower	02/13/89
D10 TRACON	01/13/91
DAL TRACAB	06/30/91
EOD ABQ:	05/16/93
CTO issued:	03/13/83
Facility rated at ABQ:	12/18/93
Air Traffic Bulletin	10/08/98
Seldom used procedures	09/02/98
Emergencies	04/30/98
Lost aircraft orientation	03/05/98

6. Controller Interview Summaries

Susan Elaine Anderson R-17 controller

On March 10, 1999, the ATC Group interviewed Ms. Anderson. In response to questions, she provided the following information:

Her date of birth is [redacted]1962. Her operating initials are AZ. She has prior military ATC experience that was gained while serving in the US Air Force with her last duty station being Tyndall AFB, Panama City, Florida. She is not a pilot. Her immediate supervisor is currently Dale McCabe; however at the time of the accident, it was Will Bryan. He had been her supervisor for almost a year. Mr. McCabe became her supervisor during the end of February. She is medically certified without waivers or restrictions and her last physical was during September 1998.

On the day of the accident she was working a 1200 to 1800 MST that she had swapped into so she could get off work a little earlier. Initially she had been scheduled to work a 1400 to 2200 MST shift. She was on the second day of a 5-day workweek. She came to be working the R-17 position as a result in the rotation of the break board. She was working both radar and associate radar combined at the R-17 position. When asked to describe traffic density and complexity up to the point prior to the accident, she said it was moderately busy, generally routine complexity, but a little bit busy. When asked if she believed she needed assistance, she said no. When asked if she understood what it meant or the ramifications at the time the pilot advised he had lost both vacuum pumps, she said no. When asked if she had understood the effect if would have on the pilot's ability to fly the airplane, she said no. When asked if she had ever, when working a position on previous occasions heard the term used, she said no. When it was noted that someone else had advised her what the ramifications were, she acknowledged this person had said that he was flying in the dark and that he needed to get down. She continued to say that to her, it meant that it effected his instruments, but that he said he had electrical backup and not being a pilot she did not really know what it meant.

To her, a backup meant that a system failed, but that he had backup. When asked if, in her experience, she had ever had to go to backup radios and not have that work, she said, the standbys, yeah I have had that happen. When asked if, beyond her Air Force or FAA experience, had she had ever attended a ground school she replied, no. When asked if she had ever taken a trip on the jumpseat, she said yes. When asked if she had done any kind of general aviation flying, she said no, only as a passenger. She had flown to Los Alamos and back with a relative in a Cessna. This had occurred about 15 years ago. When pointed out that although a pilot may advise he has a backup, it might not necessarily be working, she said, yes, but I would expect the pilot to tell me that it wasn't working. When asked if she was able to monitor the mode C [altitude] of the aircraft, she said, yes to a point. When asked what she meant, she said that when the pilot advised that he was in a spin, she did not see the mode C for a couple of seconds. She said that she could not recall how long it occurred. When asked how it was displayed, she said that she could not recall. When asked if the datablock had shown "XXX" or "N", she said that she could not recall.

When asked if she had ever given a no-gyro vector or approach, she said not while in the FAA. When asked if she had ever done so either in simulation or in real circumstance, she said she did not remember ever having done so in simulation. When asked when she had taken her last Dysim problem on unusual situations or emergencies, she said that other than her initial radar program, she did not believe that she had taken any. When asked if she could recall how long ago it had been since her last Dysim problem, she said 1991. She believed that sometime between that year and the present, she had gone into the radar simulator to run a problem, but she could not recall what it specifically was for. When asked if CBI's or the CATS programs addressed unusual situations or emergencies, she replied, emergencies. When asked if the program contained a simulation where one would have to provide assistance to an aircraft, she said no. When asked if the nature of these programs would be more academic, she said yes.

When asked if a pilot were to advise her that he was in a spin, what her course of action should be, she said that would not have done anything differently that what she did with the accident airplane. When asked if one would handle it as an emergency or whether she thought an emergency situation was occurring, she said, the spin, yes. When it was pointed out that there appeared to be no effort made to determine if the pilot was stabilized. She said that she was not going to bother the pilot, that he came on frequency and said he had it under control and that he wanted to land at Albuquerque. When it was pointed out that the pilot had advised that he was back on frequency and there was no mention of being in control, she said that when he advised he was back on frequency she walking talking to approach control. She said that we saw his mode C, observed the target again, the pilot asked for vectors and in her view, if the pilot asked for vectors, she believed him capable of doing it at that point. When asked at what point she considered the airplane to be an emergency, she said when the pilot advised of the vacuum pump failure, it was a potential emergency and that she handled it as if here were an actually emergency. When asked what the position of the airplane was in relation to the VOR when the pilot asked for vectors, she said that she did not recall.

When asked how far from the airport the airplane was, she said she did not recall. When asked what the last mode C of the airplane might have been, she believed 17,900 feet. She said that when the pilot was talking to approach control, she saw that it was lower, but she could not recall specifically what it might have been. When asked if she had ever been trained to obtain basic information from a pilot so that a course of action could be determined, she said yes. When asked what type of information would be solicited, she said aircraft identification, type aircraft, nature of the emergency and the pilot's desires. When asked if the pilot's deviation in altitude is what had prompted her attention to that particular aircraft, she said yes. When asked about the pilot's ability to track his airway or route, she said that after she questioned the pilot about his altitude, she noticed he was right of course. She went on to note that she did not see S-turns as were depicted on the radar track plot. When asked if this had been the first emergency she had encountered, she said no. When asked if this had been the first in her FAA career, she said no. When asked if she had ever encountered an aircraft, in which the pilot might be disoriented, she said no.

When asked if, since the time of the accident if she had studied anything in respect to lost aircraft or emergencies, she said that she had looked in the handbook[2] under emergencies and had reviewed it. When asked when she did this, she said last Sunday [March 7]. When asked her what had prompted her to review this information, she said the quality assurance specialist. When asked, prior to the accident, when the last time she had reviewed this specific material, she believed that it had occurred during CBI training that she had taken during the past year. When asked if this might have occurred during November 1998, she said that she could not recall. When asked if she ever believed that the pilot was disoriented, she said no, not until the pilot advised that he was in a spin. When asked if there were things that a controller could do with a disoriented pilot to them re-orient himself or regain control, she said no, not in that situation without pilot experience. She noted there was a difference with a pilot who was disoriented as opposed to one who was just lost.

[2] FAA Order 7110.65, "Air Traffic Control" Handbook

When asked if she had notified the supervisor of the event, she said she notified the supervisor more than once. The first time had occurred when he said he had lost his vacuum pumps and the second time occurred when the pilot advised he was in a spin, and the third time occurred when they heard a squeal on frequency 121.5. When asked why she might have said something to the supervisor regarding 121.5, she said she told the supervisor that they believed the airplane had crashed. When asked if she had ever heard that there are times when frequency changes should be kept to a minimum, she said yes. When asked why she decided to change the pilot to approach control, she said because of mountainous terrain, he wanted to land at Albuquerque and that she didn't work that airspace. She noted that an earlier frequency change she had issued was because the pilot had advised her that he wished to continue on to Liberal, Kansas. When asked what the minimum safe altitude is over the mountains, she said, 13,000 feet. When asked if there had been any attempt to determine where there was VFR conditions, she said no, other that to determine the base of the clouds. When asked why this was not attempted, she said that the pilot had asked for it and she obtained it. She went on to say that not knowing the full impact of a vacuum pump failure it did not enter her mind and that the pilot said he wanted to get below the cloud base. When asked in retrospect, if there were anything she would have done differently, she said not with the knowledge that she had at the time. When asked if since the time of the accident, she had gained knowledge, in which she might now react differently, she said some friends had explained vacuum pumps to her, but that she would not speculate on what she would have done differently. When asked if there had been any other controllers nearby that were a pilot, she said no. When asked if either she or her assistant had made an attempt to find out if there were any qualified pilots in the area, she said no. When asked why not, she said, I didn't think of it and it didn't seem necessary. When asked if she had received any training to assist a pilot who is not able to navigate his aircraft. She said none other than to help him in determining his position. When asked if she had received training in helping a pilot to navigate where he needed to go, she said yes. When asked how much time might have elapsed from the time of the last observed mode C until the pilot was advised to switch to approach control. She believed it might have been 6 or 7 minutes but also noted that she would have to look at a transcript to be sure.

Kathleen Frances Gallagher — Associate Radar Controller

On March 10, 1999, the ATC Group interviewed Ms. Gallagher. In response to questions, she provided the following information:

Her date of birth is [redacted] 1965. Her operating initials are KV. She is medically qualified as a controller with a waiver to wear contact lenses for nearsighted vision. Her last physical was during October 1997. She was wearing her contacts on the day of the accident. She has no prior military ATC experience nor is she a pilot. Her immediate supervisor at the time of the accident was Will Bryan and he had been for about 2 years. Currently her immediate supervisor for about a month has been Dick Kinderbuck. On the day of the accident she was working an assigned 1400 to 2200 MST shift which was the second day of a 5-day workweek. At the time of the accident, she was working the associate radar position at sector 17. Initially, she had plugged into the R-side to relieve the controller then moved to the D-side. When asked

why she had done this, she said that when she plugged in, she had inquired if the flight [N79NL] was level, and when the pilot advised that he was having problems, she thought that it would be too complex. When asked what she thought would be too complex, she said it was fairly busy at the time, and she the pilot advised of losing his vacuum pumps, and given his proximity to other sectors, she believed it would be easier to have two people at the position. One to do the coordinate and the other to work the airplanes. When asked what gave her reason to believe it was a potential emergency, she said, anytime someone says they have difficulty with equipment it is a potential emergency until I know otherwise. When asked if there was anytime she thought otherwise, she said no, there was never a point I thought he had totally cleared his difficulty, but I never thought that it was an emergency, only a potential emergency. When he said he was in a spin, I thought it was one [emergency] then. When asked if the airplane seemed to be erratic or having a problem in navigating, she said she did not notice. She did coordinate with adjacent sectors to advise them of equipment problems and because she was not sure if the pilot wanted to land at Albuquerque, she wanted that specific sector to know where the airplane was. When asked where the sector 94 airspace would be in relation to the Albuquerque airport, she noted that because the area shares airspace with approach control, the airplane would have been about 15 miles from that particular airspace. When asked if she knew what the ramification of losing vacuum pumps had, she said no. When asked if since the day of the accident she had learned of the ramifications, she said yes. When asked what it meant to her, she said she understood that a pilot would lose their instrument panel and that it would be difficult for a pilot to know their attitude. When asked if she had noticed the airplane to have an erratic mode C, she said no. When asked if she ever believed there was a sense of urgency in handling the flight that needed to be accomplished, she said she felt it was urgent to respond to the pilot's intentions. She noted that the pilot had asked for a lower altitude and that they got that for him. She went on to say that when the pilot advised he was in a spin she felt that it was urgent. When asked if the mode C had been lost when the airplane was in a spin, she said yes. When asked if she had observed the mode C go from one altitude to a different altitude once it was regained, she was it was lost for a while and didn't show anything. She then asked the pilot to say his altitude and he reported either 17,800 or 17,900 and the mode C was indicating 18,000. She went on to say that she was not exactly sure what the pilot said, but she believed something like I'm indicating seventeen nine or seventeen eight or something. When asked if she had posed the question to the pilot about if he wanted to land at Albuquerque, she said yes.

She noted that the radar controller had asked the pilot the same question earlier. When asked what she thought that it meant when the pilot advised that he was back with you, she said that he had regained control of his aircraft. When asked that without the pilot specifically stating so, [having regained control of the airplane], she really did not know, she replied that's correct. When asked if she had received training to determine if a pilot can maintain an altitude, heading or is able to navigate, she said with navigation one could eventually tell, and the altitude if he was getting. When asked to relate the answer specifically to the accident airplane she said, the pilot would have to tell them he could not navigate, and if he was maintaining his altitude within a few hundred feet they could tell. In her view, it would take some time because of the speed of the airplane. When asked if, based on questions posed to a pilot could one determine if he is disoriented, she said no, I don't think so. When asked if one could determine if the airplane was stable or not, she said I don't know, I'm not

sure. When asked how one could determine if the pilot could navigate, maintain a heading or altitude, if there were no questions posed to the pilot, she said that she would expect the pilot to tell her. She noted that had the pilot advised that he could not maintain a heading a no-gyro turn could have been issued. When asked if the pilot advised he could not maintain an altitude, what she would do, she said she did not know. When asked if the pilot said that he could not navigate, what she would do, she said offer no-gyro vectors.

When asked if just she, or both she and the radar controller had an assumption that the pilot was in control of the airplane, she said she did not know if the radar controller did. For herself, she wasn't sure and she asked the pilot if he wanted to land here [Albuquerque]. The pilot replied yes and when he said he wanted vectors she assumed that the pilot was capable of taking vectors. When asked what the last mode C readout that she had observed, she said eighteen [FL180]. Her last observation of the mode C was at fourteen five [14,500 feet]. When asked if the pilot had requested a descent and it was issued, was it unusual that he stopped at 18,000 feet. She said no because the pilot had been in a spin and when he came out he was trying to stabilize himself and it was for a very short period of time and she was still talking to the pilot. When asked if she had reviewed section 10 of the ATC Handbook that speaks to emergencies, she said, not since the accident, no. When asked if she had studied anything that she believed was relevant to the accident. She said no. When asked the last time she had taken a Dysim problem, she said she was not sure of the date, but that it was about a year ago. When asked what the purpose of the problem was, she said it was training following an operational error. When asked, other than that, when was the last Dysim problem she had taken relative to a lost aircraft or an emergency, she said she could not recall the date, but she guessed it was about 3 years ago. When asked if the CBI regarding lost aircraft had anything that would assist in an accident such as had occurred. She said that she did not believe so. When asked if the CBI contained any type of simulation, she said no. When asked if she had issued the heading of 260 to the pilot of N79NL, she said yes. When asked if she had observed the airplane take the issued heading, she said it did not appear so. When asked what the heading of the airplane appeared to be prior to being issued the heading of 260, she said about a 280 heading. When asked what he heading of the airplane might have been prior to reporting difficulties, she said about a 060 heading. When asked to confirm that the airplane had almost reversed course, she said yes. When asked if anyone had questioned that, she said well, if he told us he was spinning I wouldn't think it would be necessary.

When asked if she had assumed the airplane was under control, she said that she assumed the airplane was no longer in a spin. She also noted that there was no certainty that the airplane would stop the spin in the same direction at which he entered it. When asked if it seemed strange that approach control wanted the airplane on a heading of 260, she said she thought it was because the airplane was right over the Sandias [mountains] and they wanted to get him [the airplane] away from the mountains and get the airplane lower.

William Duane Bryan Area Supervisor

On March 10, 1999, the ATC Group interviewed Mr. Bryan. In response to questions, he offered the following information:

His date of birth is [redacted] 1947. He had no prior military ATC experience nor is he a pilot. His operating initials are BN. Rudy Guiterrez is his immediate supervisor and has been for about 1.5 years. He is medically certified as a controller with waivers for glasses to correct distant vision and an erratic heartbeat that is treated with medication. His last physical was during June 1998. His assigned shift on January 20 was a flex-shift between 1200 to 2000 MST and 1400 to 2200 MST so he worked from 1140 to 1940 MST. It was the second day of a five-day workweek. There was another supervisor assigned in the area as the operational supervisor who was working a 1500 to 2300 MST shift. About 1500, he relieved this person so he could attend a stand-up briefing. When asked what the staffing for the area was, he said that he did not know. He did note that all sectors were open with the exception of sector 73. He could not remember if all sectors were manned with one or two controllers. When asked how breaks are managed, he said that the north specialty uses a break bay. He noted that other areas use a break list. When asked who manages the bay, he said the first line supervisor did. When asked where in the area he was generally located, he said that he was walking around the area. When as, overall in the area, how the traffic was? He replied the traffic was probably slow for that time of day and there was not a lot going on. When asked how the accident aircraft had come to his attention, he said, to step back a bit, Susan was working R and D-17. Kathleen went over to relieve her and give her a break. During this time, the pilot made a comment about problems with the airplane and then Kathleen stated on the D-side and Susan stayed on radar. They both stayed on these positions because of the complexity of traffic at the time. The decision for Kathleen to work the D-side was a collective decision between the two of them. When asked what they thought was going to increase the complexity, he said he could not recall if he saw something or that Susan had said something. He said that he ended up behind Susan after it all started. When asked what was conveyed to him, he said there were a couple of things. He noted it is unusual when one controller is to be relieved and yet they both stay at the sector to work. He also said that he overheard Susan say something to him about an aircraft losing both of its vacuum pumps and had electrical backup, and later on it was relayed to him the airplane was in a spin. He noted that initially, even though the pilot had lost his vacuum pumps and had backup, things were not too severe at that point.

When asked if he had remained behind the sector, he said yes. He said concerns escalated when it was learned the airplane was in a spin. He then notified the operational manager at the front desk of what was happening. When asked where he had made the call from, he said that he was not sure if the manager was in the area or that he had called and asked him to come out to the area. Although he was not sure, he noted that the operational manager did come out to the area. When asked if he had called him, from where would the call have been made, he said it would have been from the supervisor's desk and that the desk would have been between him and the sector. When asked if the frequency was in the speaker so that he could monitor communications, he said no. When asked if he had made an attempt to monitor, he said no, he was receiving information verbally from Susan and Kathleen. When asked

if he understood the ramifications of a pilot losing his vacuum pumps, he said he had some second hand information, but as a pilot he did not know.

When asked if he knew the ramifications of losing vacuum pumps on the day of the accident, he said no. When asked if he knew the ramifications since the day of the accident, he said yes. When asked what had spurred him to learn the ramifications, he said it was hearsay on the sectors and the coffee shop, with people describing what the ramifications were, and there was some Monday morning quarterbacking. When asked what source he had gone to, he said that he talked to people within the facility who are pilots. When asked if he had considered the airplane to be in an emergency, he said he personally, did not. When asked if it had been told to him that he airplane was in a spin, did he consider it an emergency, he said no. When asked why not, he said it was based on things being relayed by the pilot. He said the pilot was asked if he wanted to land at Albuquerque and he chose not to do that because he seemed more concerned in getting base reports to continue on to Liberal [Kansas], and the pilot never declared an emergency. He said that it led him to believe when the pilot was at FL180, everything was okay. He said that this did not stop them from treating the pilot as if it were an emergency.

When asked if a pilot advises that he is in a spin, if as a controller are there actions which can be taken, he said that he would not try to fly the aircraft, but accommodate him with whatever he needed such as base reports, wind, weather, et cetera. When asked if one would attempt to determine if the airplane were stable, he said yes, if he had time. He went on to note that controllers are taught not to distract the pilot, that they are taught to get him on an established heading and those kind of things.

When asked if it were correct that a controller would not have to have pilot skills to determine if a pilot could hold a heading, maintain an altitude or navigate, he said that is correct. When asked if controllers are taught those skills, he said yes. When asked if at any point after being told the airplane was in a spin that he believed it was under control, he said he believed after the pilot told Susan that the aircraft had leveled at FL180 and that everything was okay. When asked if he had ever observed the mode C of the airplane, he said no, he thought that he had looked but he could not recall what he had seen. When asked if he might have seen, "XXX" or "N" in the datablock, he said he did not recall seeing that. When asked if he had performed any coordination with approach control, he said he was on the phone with the supervisor at approach control confirming everything that had been told to Susan. When asked how long the conversation might have lasted, he said he did not recall, but believed it was very short. When asked if the airplane was handed off to approach control, he said that he believed that it was.

When it was noted that he had been Susan's supervisor and how he would describe her as a controller, he said she is an excellent controller with skills, good work ethic and phraseology and very conscientious. When asked his view on the training of controllers and his having to evaluate their performance, if the program they receive prepare them to deal with a situation such as they had? He replied that it comes out of a CBI or 3120 Handbook items and he could not remember that or anything in CBI, but he did believe it came in radar training. When asked when his last Dysim problem was, he said when he had changed specialties about 5 or 6 years ago.

When asked his view of CBI's and if there were more academic rather than operational, he said if is fairly new, that there were FPL refreshers on different topics. He continued to note that it is more a classroom versus an operational thing with no hands-on training with the key to refresher being what you had been taught on the D and R side. When asked if in trying to determine if a pilot can hold an altitude or heading, if he believed those questions should have been posed to a pilot to said he was in a spin? He replied that he did not know because he did not hear the conversations with the pilot and based on what he did hear, he believed they [Susan/Kathleen] had done an excellent job. He noted they had asked the pilot if he wanted to land at Albuquerque, had obtained base reports and that she was trying to accommodate the pilot and obtain information from him. When asked if he had listened to the recorded voice communications, he said no.

John Michael Riley North radar controller - Approach Control

On March 11, 1999, the ATC Group interviewed Mr. Riley. In response to questions, he provided the following information:

His date of birth is [redacted] 1959. After being hired by the FAA, he attended the academy in Oklahoma City, Oklahoma. His operating initials are MR. Janet Gordon is his immediate supervisor and has been since just before the day of the accident. He has not prior military ATC experience. He is a pilot with commercial, single and multi-engine, instrument, and CFI ratings. He has about 1450 hours of logged time. He is not current. He is medically certified as a controller with no waivers or restrictions. His last medical was during December 1997. On the day of the accident, he was working a 1445 to 2245 MST shift which was the first day of a 5-day workweek. He had not been on a break because after arriving at the facility, it was his first position of the day.

When asked how traffic conditions were prior to the accident airplane coming to his frequency, he said that he really did not remember, but believed it was light. When asked if it were routine, he said yes. When asked what the range of the radar display was set to, he believed it was 45 miles. When asked if he was depicting any weather, he said that he did not remember any weather being depicted. When asked if it had been set to depict weather, he said yes. When asked to what intensity level it had been set, he said that he did not remember. When asked to confirm that an intensity level had been set, he said that it was. When asked if his display was depicting both primary and secondary radar targets, he said that it was. When asked to confirm that he initially received a point-out on the accident airplane, he confirmed that he did. When asked how the airplane was depicted on this radar display at that time, he said that he believed that he had started a track on the target. When asked what altitude was displayed on the target, he said that he believed either FL230 or FL210 and that he would have to go back to remember what it actually was. When asked the approximate position of the airplane, he said that believed the controller had told him seven miles northeast of the VOR and that was pretty much on.

When asked what the filter limits of the display were set to, he said that he did not remember. When asked if had checked them or reset them when he took

over the position, he said that he did not set or recheck them. When asked how long he might have been on the position when he received the point-out on the accident airplane, he said between 15 to 25 minutes and that he would have to check to be sure. When asked if he had observed the target of the airplane prior to receiving a point-out from the Center, he said he could not recall. When asked to confirm that he did not recall seeing the track of the airplane at that time, he said that he probably saw the target or that he may have seen it and was just not watching the target. When asked the track of the aircraft at the time he initiated a track he said it was north to northeast bound somewhere in that general area. When asked if the track of the airplane changed or that it changed to the point that he noticed it, he said I believe it did. He thought that it was on a more easterly direction when the pilot made initial contact and that since it was in a turn during the time that he was talking to it, the heading was different from the easterly heading. He noted that he would have to look at the data extraction to check. When asked if the airplane appeared to reverse course. He said that from the time of initial contact it was in a right hand turn, possibly eastbound or further around and it continued to the right to north or northeast bound and when it reached northeast it descended rapidly and hit the ground. When asked if he had leader lines in use, he said yes. When asked if he could tell from the leader line which way the airplane was turning, he said no. When he was asked if the center had told him the aircraft was in a spin at the time they had given him the handoff, he said he believed she said he had been in one or recovered from one. When asked what time he had last reviewed the transcripts or recorded voice communications concerning the accident, he said it was several days after the accident and not since then.

When asked if he recalled telling the Center to put the aircraft on a heading of 260 he said yes. When asked if he ever observed the airplane attempt to maneuver to that heading, he said no, that is where the aircraft appeared to be in a right turn so there didn't seem to be an attempt to fly the heading. He knew the airplane was in a right turn. When asked when he first observed the airplane in a right turn, he said that he believed it was when I gave the pilot information about being on a northwest heading that, I know he is in a right turn. When it was noted that he asked for control of the airplane, he was asked to confirm that he was given control of the airplane and he replied, yes. When asked if he had made a flightstrip or had written anything down, he said no not at that time. When asked how he had identified the airplane when he did the track start, he said that he believed that he had just typed in IFR. When asked if he had made any attempt to change it after he took the handoff. He said that there was an auto-handoff when the aircraft was amended to land at Albuquerque and they received a flightstrip and ARTS information, but he did not remember if he started the track or it auto-acquired.

When asked if the pilot's having lost both vacuum pumps had any significance for him, he said yes. When asked what is significant about it, he said that possibly the attitude and heading indicators were not functioning properly. When asked when the pilot advised him that the electric compass and horizon do not agree, if he thought that was significant, he said yes. When asked in what manner, he said with some of the instruments are not agreeing, he's probably got vertigo, disoriented and doesn't know what's up or down. When asked if he considered that to be significant, what he was trying to determine by asking the pilot is he was stable. He said he was trying to ascertain if he is in control of the aircraft, straight and level for sure, but that he is control of the aircraft basically. When asked if what he was trying to determine if the

he [pilot] were in control, why he did not just ask him that, he said the words came out are you stable and he had no idea why those words came out. When asked if he remembered the pilot advised that they were not necessarily stable, he said yes sir. It was posed to him that after being advised they were not necessarily stable, that based on his view the pilot might be disoriented or has vertigo and may not know up or down. Why did he ask the pilot if he could accept right turns and would this not increase the risk of becoming more disoriented? He said his thought was what can I do to help him, and if he is disoriented a standard right turn is something he can do for me. When asked to explain what a standard right turn would do for an airplane that is already in the right turn. He said, one of the procedures for an aircraft that has lost some of its instruments is standard rate turns or no-gyro surveillance turns and we are trained in that and pilots are as well. When asked if he believed that a pilot might have vertigo, might not a turn further exacerbate the condition, he said, it is always possible. He continued that in this case he believed that it was the only thing that might help the pilot. When asked what he was trying to determine when he advised the pilot that he appeared to be northwest bound at this time, he said I was trying to think of something to provide him with some help. When asked if he had observed the mode C of the airplane when the pilot advised of being at 14,400 [feet], he said at that exact moment I don't recall, I may have seen it or I may not have. When asked what was the last mode C that he had observed, he said, the last he remembered was 8,600 [feet]. When asked the elevation of the area, in which the airplane was, he said he knew the area goes up to 11,000 feet. When asked if he had received an MSAW alert, he said that he did not recall. When asked if he should have received one, he said that he did not know the parameters of the program, but he would not doubt it going off under the circumstances. When it was noted after the aircraft's last transmission there was a period of about 30 seconds in which services were terminated to another airplane, why there were no further transmissions to the aircraft other than asking the pilot to ident. He said that after the transmission of, we're going down, the target went into coast and it was his belief the airplane had hit the ground. He was trying to think if there was anything he could do if they were still alive and he was also telling the supervisor that the airplane had just crashed. When asked if in questioning the pilot if he could accept standard rate turns if that since he was trained to conduct surveillance approaches, if he was referring to a turn and bank indicator, he said yes. When asked if a turn and bank indicator would provide a pilot with the ability to determine if he was flying straight and level, he said, yes if it is working properly.

When asked if the attempt to give a standard right turn was an effort to get the airplane away from high terrain, he said as the aircraft continued the turn, yes and at the moment he was northwest bound, he was parallel to the terrain. When asked if he had any idea of how it was before the airplane got too close to the terrain, he said that the aircraft was heading for the highest point in the mountains when he asked the pilot if he could turn right. When asked if he had the target of the airplane at that time, he said yes. He could not say for sure if it was a long time. When asked to describe a turn and bank indicator, he said that most have a profile of the airplane wings with marks for wings level and that there is a mark below that point on the right and left side to indicate a standard rate turn. He went on to describe a spirit level that is curved as opposed to being straight, and it tells a pilot when in coordinated flight. When aileron and the rudder are used, the ball moves to the bottom of the arc. When asked if he would expect a pilot to turn a turn and bank indicator for standard rate

turns, he said yes. When asked if it would be used as a backup to an attitude indicator, he said yes. When asked how it would be powered, he said they are normally electric. When asked if a pilot would use it as a backup to an attitude indicator he said yes. When asked if he eventually got a flightstrip on the airplane, he said yes. When he received the flightstrip, the airplane was off the frequency and that there was no attempt to mark the strip. When asked how the target of the airplane would have been depicted when it was pointed out to him, he said it was a target with an altitude if within the confines of the filter limits. When asked to what level the filter limits would be set, he said one thousand feet above that.

Janet Gill Gordon Area Supervisor

On March 11, 1999, the ATC Group interviewed Ms. Gordon. In response to questions, she provided the following information:

Her date of birth is [redacted] 1954. After being hired by the FAA, she attended the academy in Oklahoma City, Oklahoma. She is current on all positions at Albuquerque and works more than the basic required hours, usually about 20 hours in the tower and 10 to 15 hours in the radar room. She works the north high and low position about 3 times a month. She maintains currency on surveillance approaches. Her operating initials are JG. Her immediate supervisor is Mark Reeves and has been since October 1998. She has no prior military ATC background. She is a pilot but is not current with commercial, single, multi-engine, instrument and CFI ratings. She has about 500 hours of logged time. She is medically certified as a controller with a waiver to wear glasses. She wears bifocals for both near and distant vision. She was wearing glasses on January 20, 1999. She was working an assigned 1430 to 2230 MST shift, which was the first day of a 5-day workweek. She was assigned as the operational supervisor in the TRACON. Staffing that day was normal with 3 full performance level controllers and a developmental. Low positions were combined on the high positions, which is normal.

She became aware of the accident aircraft when the supervisor at the center called her. When asked what she was told. She said they were having trouble with him, the pilot had some problems with the vacuum system, the pilot had not declared an emergency. The supervisor had stated words to the effect of, "keep an eye or him or you may want to treat him as an emergency", she could not remember exactly. When asked if at this point it had been determined that the pilot wanted to land at Albuquerque she said yes, he was coming here to land. When asked if there was any sense of urgency in the caller's voice, she said, I can't remember ever having gotten a call like that before so it definitely got my attention. When asked if the caller had given her any indication that the airplane had been in a spin or an unusual attitude, she said she could not remember. She knew that at some point it had happened once, but she could not remember if the caller had told her that. When asked if she might have learned of it from Mr. Riley, she said after the fact possibly. When asked that given her background if the fact that the pilot had lost his vacuum pumps have an impact on her, she said that she knew he would not have instruments, that some instruments would not be available. When asked to amplify what she meant by some, she said mainly attitude type of instruments if he was in the clouds. When asked what

would be the significance of such, she said not having a horizon, in the clouds he would not have a horizon to orient himself.

When asked to clarify if she had received the telephone call from the center the same time that Mr. Riley was talking to the pilot, she said it was probably all happening at the same time. She recalled that she was getting a strip on the airplane right before the phone rang. She recalled that Mike had asked if she had a strip and then the phone rang. She was not sure which happened at what time. When asked if she had gone to the printer and then the phone rang, would she had to have returned to the supervisor's desk, she nodded affirmatively. When asked what occurred after the phone call, she said that she called the supervisor in the tower to tell her what was going on. When asked how long the call took, she said not more than a minute that's when we saw the aircraft come down. When asked where she was physically located when she called the tower, she said she would have been at the supervisor's desk. She then indicated that while she was talking to the tower supervisor, there was a CONRAC display on which see could see the tower BRITE. When asked how the call to the tower was made, she said on the landline. When asked if she would have to dial a regular phone number, she said just dial 504 and it was an extension up there. When asked if she had physically moved to the position at any time, she said although she could not remember the exact sequence, she must have hung up on the tower supervisor when she saw the airplane go down because she was standing at the final scope. When asked to confirm that the final scope was to the left side of the TRACON she said yes. When asked to confirm that it was the radarscope next to the position that Mr. Riley was working, she said yes. When asked if Mr. Riley had given her any indication of what was occurring, she said that she could not remember, but could hear what he was saying. In her view, it was obvious when I was becoming aware of the problem from the sup [center supervisor] he was becoming aware of it. When asked if she had heard any of the pilot's conversation, she said no. When asked how the aircraft appeared at it related to its track, she said that when the supervisor called her, the airplane appeared to be heading normally and she didn't notice anything unusual at the time. The airplane was coming from the northeast, southwest bound and she noted that he may have been in a descent, it wasn't that unusual...he was just heading this way. When asked if she meant toward the airport, she said, toward the airport. When asked what then occurred, she said that she called the tower to let her [supervisor] know it was a possible emergency and to stop departures because he was in the departure corridor and that is when I saw him go down.

When asked what she might have observed to give her the impression that the airplane had gone down. She said he was at 14.4 or14.2 [14,400 or 14,200 feet] then his mode C went to "XXX"s and then it showed 8,600 and that is when I hung up the phone. When asked if the airplane was tracking toward the airport, she said no after he was at 8,600 I'm not sure if I saw another mode C but then he went into coast. When asked if these observations had occurred on the CONRAC, she said that she was not sure when she got over to the final position. She said that I got over there quick enough to tell Mike to put the tag in handoff status so that we wouldn't lose him. When asked if other than herself, if there were any others in the room who were pilot's, she said Mike is a pilot, others, no. When asked if there had been any MSAW alerts on the aircraft, she said she did not recall. When asked if they had received an ELT, she said that I don't think we got, Rick and I discussed it, I don't recall it going off. When asked that although the pilot did not declare an emergency, did you consider it to be

one, she said we were treating it as an emergency. When asked if she had heard the recorded voice communications concerning the accident, she said no. When asked in her view, if this pilot is ever disoriented, she said, yeah my feeling is that he was and Mike said something like are you under control or can you take a heading or something that made me realize that he was probably disoriented. When asked if there is anything a controller can do for a pilot that is disoriented, or can a controller determine specific information. She said that most controllers are aware when a pilot is in a distress situation and that you do not need to be a pilot to know that.

When asked if a controller believes a pilot is disoriented, is there information he can ask of the pilot to determine if what he suspects is valid. She said yes, it happens and she has heard controllers ask pilots. When asked if a controller would attempt to assist a pilot in determining if they were disoriented, she said no. When it appeared she did not understand the question it was re-phrased to, if you have an aircraft that you suspect is disoriented, what you would as a supervisor expect the controller to ask the pilot. She said, ask the pilot if he needed assistance because it is a generic question. When asked what she would expect the controller to do if it were confirmed the pilot was disoriented, she said that she was aware by what Mike was saying not by what the supervisor had told her. She continued between the time Mike made a comment about can you accept a heading or something, between then and the time the airplane came down, it was not even a matter of minutes. There was nothing the controller could do other than stay calm, ask simple questions, such as are you lost, are you in need of assistance. When asked if a controller beyond determining if a pilot is under control, would there be any other information a controller should glean from him, she said it would depend on the answer to the question, if the pilot says no I am not under control, it is case specific. She said that she was having a hard time in formulating an answer. To the question, is the training you receive adequate enough to deal with this type of situation, she said she did not see what any other training would have done, so yes. When asked to confirm if she was Mr. Riley's supervisor, she said yes. When asked how long she had been his supervisor, she said that he had come on her crew within a week of the situation [accident], and was not sure of the exact date. When asked how often she had worked with Mr. Riley prior to becoming his immediate supervisor, she said frequently, because he was only a day off of me, so we worked together. When asked if she had actually stopped departures when she called the tower supervisor, she said probably not.

When asked how much time had elapsed from the telephone call to the loss of the target on radar, she said she was not sure. When asked why she asked Mr. Riley to put the track of the airplane in handoff status, she said in a handoff status it would not drop off the radar display. When asked if the facility has a freeze patch, such as that at the Dallas/Ft. Worth approach control, she said no, we're an ARTS IIIA. When asked if she was aware that the pilot had lost his vacuum pumps, she said yes. When asked if Mr. Riley had informed him of the conversation with the center supervisor, she said that she didn't bother him and that he wasn't aware. When asked if Mr. Riley had informed her of the status of his instrumentation, she said that he did not tell her about that or backup systems. When asked if Mr. Riley had put the frequency in the speaker so she could hear what was occurring. She said no, we do not do that unless we are trying to interpret because it is so distracting. When asked if there were handsets to monitor the position, she said that had it gone on, she would have done that. When asked if she could monitor the position from the supervisor's

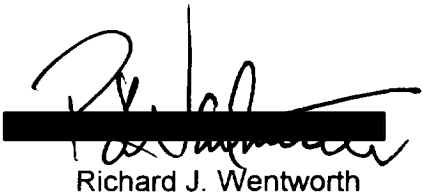
desk, she said yes, but we don't do it because it is so isolated and she did not have time to monitor in any regard.

7. Air Traffic Control Procedures

Air traffic control procedures are contained in FAA Order 711.065, "Air Traffic Control" and are supplemented by local standard operating procedures (SOP). It was learned by the ATC Group that the radar display at the R-17 sector would have been set to a range of 125 nautical miles. It was also learned by the ATC Group that the controllers at Albuquerque approach control are required to provide surveillance approach procedures. A copy of the facility approach log is attached to this report.

8. Radar Data

The Safety Board's investigator-in-charge received radar data from the Albuquerque Center and approach control. This data was sent to Safety Board headquarters in Washington, D.C. and was processed by the Vehicle Recorders Division of the Board. All track plots are attached to this report; however, more detailed information will be developed by Safety staff and contained in a separate report.



Richard J. Wentworth
ATC Group Chairman
NTSB AS-30

ATTACHMENTS TO ALBUQUERQUE FACTUAL REPORT

1. Air Traffic Services Accident Package with 11 sections
2. ASR approach currency requirements and logs from ABQ TRACON
3. ABQ TRACON airspace
4. Sector 17 airspace
5. Memo regarding CBI training
6. Memo regarding Interpretation of FAA Order 3120.4, paragraph 2-12b3
7. ABQ ATCT Facility Technical Training Order
8. Radar Track Plots