NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594

September 5, 2000

Addendum to Factual Report

AIR TRAFFIC CONTROL GROUP

DCA-99-MA-060

A. ACCIDENT

Location: Little Rock, Arkansas

Date: June 1, 1999

Time: 23:51 Central Daylight Time (CDT) / 04:51 Universal Coordinated Time (UTC)

Aircraft: American Airlines 1420 (AAL1420), McDonnell-Douglas MD-82, N215AA

B. AIR TRAFFIC CONTROL GROUP

Chairman:	Mr. Scott J. Dunham National Transportation Safety Board Washington, D.C. 20594
Member:	Mr. Randy L. Graham Federal Aviation Administration Little Rock, Arkansas
Member:	Mr. Samuel Smith American Airlines Fort Worth, Texas
Member:	Mr. William Shea National Air Traffic Controllers Association Fort Worth, Texas
Member:	Captain Patrick Gallagher Allied Pilots Association Fort Worth, Texas

C. ADDITIONAL FACTUAL DATA

To resolve new questions about the air traffic control services provided to AAL1420 during its arrival at LIT, the ATC group reconvened at Little Rock airport on August 1 and 2, 2000. Captain Gallagher was unable to participate because of a schedule conflict.

During the afternoon of August 1, the ATC Group Chairman visited the tower cab to photograph lighting control panels, runway visual range displays and other equipment used by LIT controllers, and document tower views of runway 4R/22L. These photographs are labeled and included in the body and appendix 1 of this supplemental report. Mr. Shea and the Group Chairman returned to the tower at 9:00 PM to evaluate the ability of controllers to see aircraft operating on runway 4R/22L during hours of darkness. Although the visibility was reported as six miles, we noted that it is virtually impossible to observe small details such as control surface deflections on aircraft operating on runway 4R/22L.

Runway 4R is served by a category I instrument landing system (ILS), high intensity runway lights (HIRL), runway visual range (RVR) sensors at the arrival and departure ends, and a medium-intensity approach light system (MALS) with runway alignment indicator lights (RAIL). When installed together, the two lighting systems are referred to as MALSR.

Photographs 1 and 2 show the HIRL light control panel for runway 4R located at the local control 2 position in the LIT tower cab. All photographs in this report were taken on August 1 and 2, 2000.

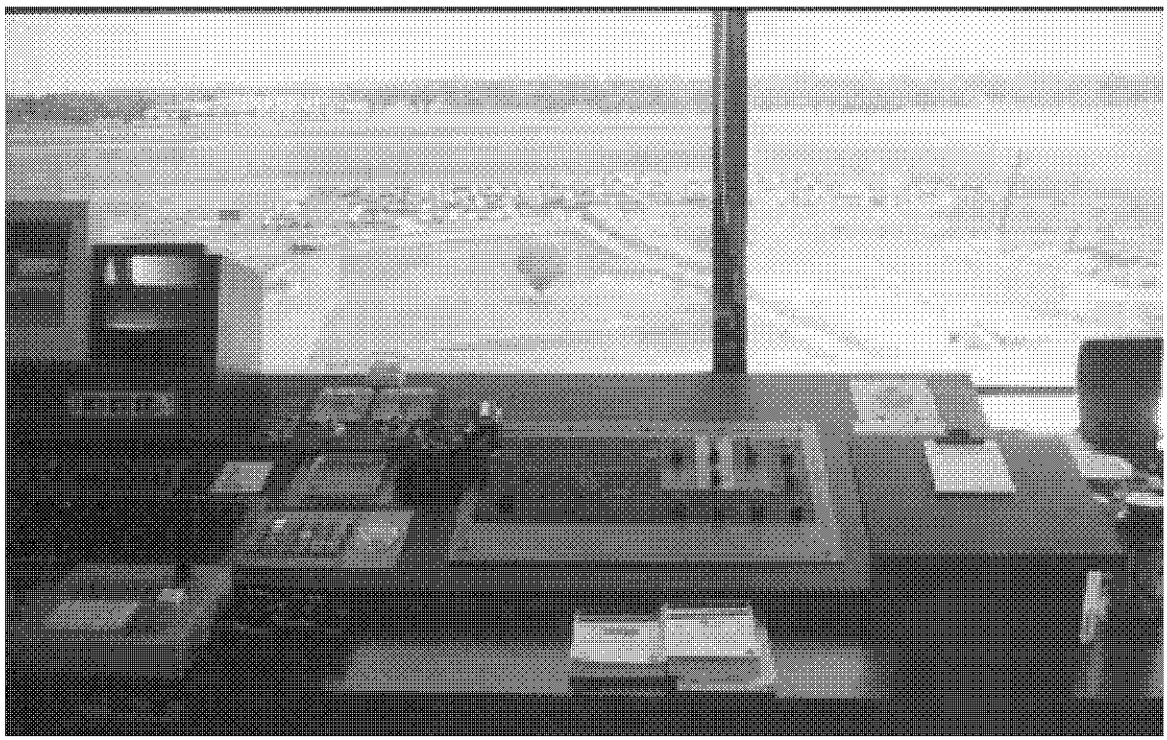

Photo 1: Little Rock runway 4R HIRL lighting control panel at LC2 position.

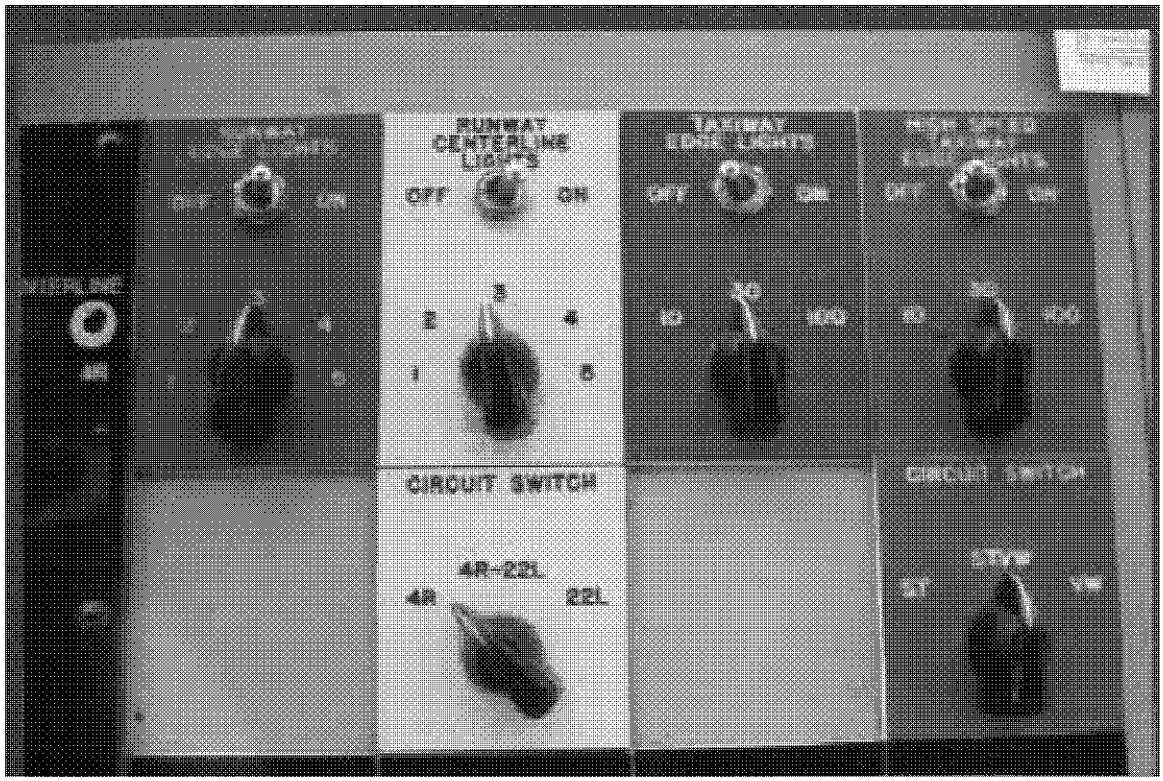

Photo 2: LIT runway 4R HIRL control panel detail

RVR Information

RVR displays are located at the LIT LC1 and GC1 positions. (Photo 3) According to FAA technicians, when activated these displays provide continuously updated (approximately two second refresh cycle) runway visibility information to tower controllers. Each horizontal line represents RVR readings for a single identified runway. Three columns are available to display touchdown, midpoint, and rollout RVR values. Runways 4R/22L have only touchdown and rollout sensors, so the midpoint column is blank. The far right numbers show the present light intensity settings for the runway edge and centerline lighting. Although photo 3 shows an RVR reading for runway 4L, on 6/1/99 the runway 4L RVR sensors were still being installed and were completely out of service. Runway 18/36 does not have RVR equipment installed. Therefore the only RVR available for display to controllers at the time of the AAL1420 accident would have been for runway 4R/22L. Each runway would have its own line as shown in the photograph, and under the equipment conditions existing on 6/1/99 the last line would have been blank.

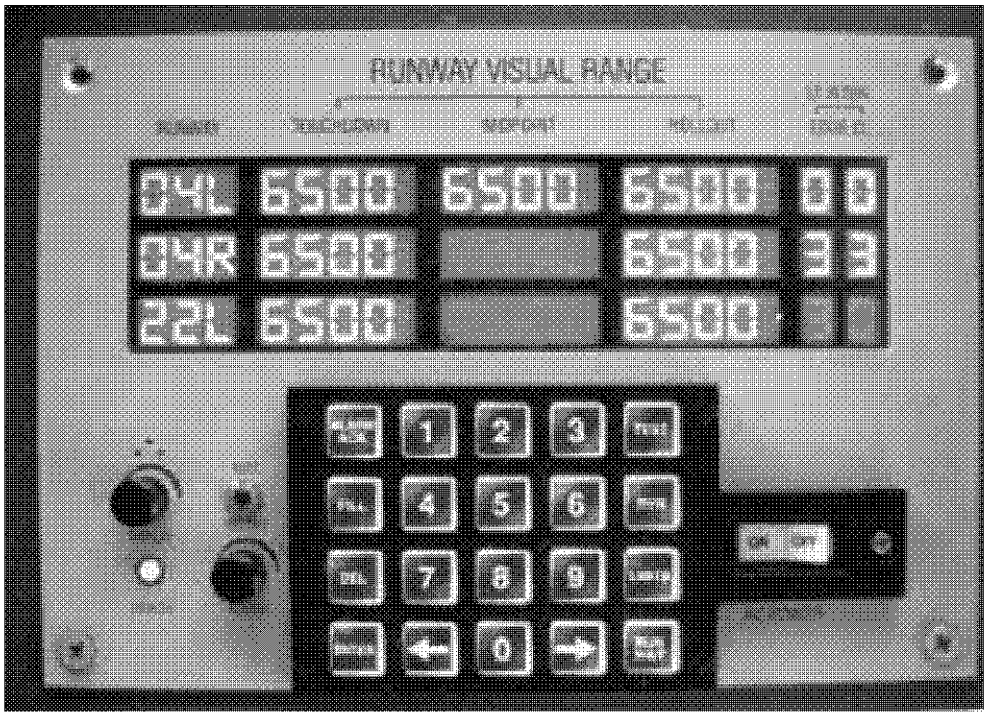

Photo 3: LIT runway visual range display

The runway visual range sensors for runway 4R/22L are located abeam the painted touchdown zone markers at each end of the runway. These sensors are of the "forward scatter meter" type. According to the Federal Meteorological Handbook, they operate by measuring the extinction coefficient of the atmosphere and deriving RVR from a series of computations. They sense particulate matter in the air of whatever type (dust, precipitation, etc.) and produce a display giving visual range along the runway in hundreds of feet. All the RVR sensors on the airport are identical, are about 18 feet tall, and are located next to the ILS glideslope antennas abeam the painted runway touchdown zone markers. (Photo 4) Their accuracy is unaffected by runway light settings, unlike the older RVR systems still in use at other airports. The RVR system has a rolling archive capability, recording and overwriting a finite number of records. In order to record and hold detailed RVR data, the system must be set to start an event log within two hours of occurrence, or the data will be lost. This was not done after the AAL1420 accident, hence no detailed RVR readings were retained. There is a separate log of data recorded at one hour intervals that shows displayed RVR values, runway edge light and centerline light settings, and the amount of ambient light in tenths of a foot-Lambert. There is no recorded RVR data available for the AAL1420 accident beyond that obtained as part of the initial on-scene investigation. RVR systems documentation is contained in FAA TI 6560.17, "Runway Visual Range On-Site Requirements." FAA order 6563.31 contains data retention requirements and procedures for RVR systems.

Photo 4: LIT Runway 4R RVR Sensor

Approach Lighting Information

The approach lighting systems for all runways are controlled from a panel located to the left of the LIT LC1 position. (Photos 5, 6, and 7) The MALSR system for runway 4R is controlled by pushbuttons along the top row of the panel. The MALS portion of the system can be set to OFF or one of three progressively brighter steps. The RAIL segment has ON/OFF buttons. The RAIL cannot operate unless the MALS is activated. When the MALS is on, activating the RAIL system automatically sets it to the same step (1, 2, or 3) as the MALS. The MALSR controls are completely independent of the runway edge lighting systems: there is no interface between the MALSR and the runway lights. MALSR settings are not logged, so it is impossible to retrospectively determine approach light settings at a given time.

Photo 5: Approach lighting control panel at LC1 position

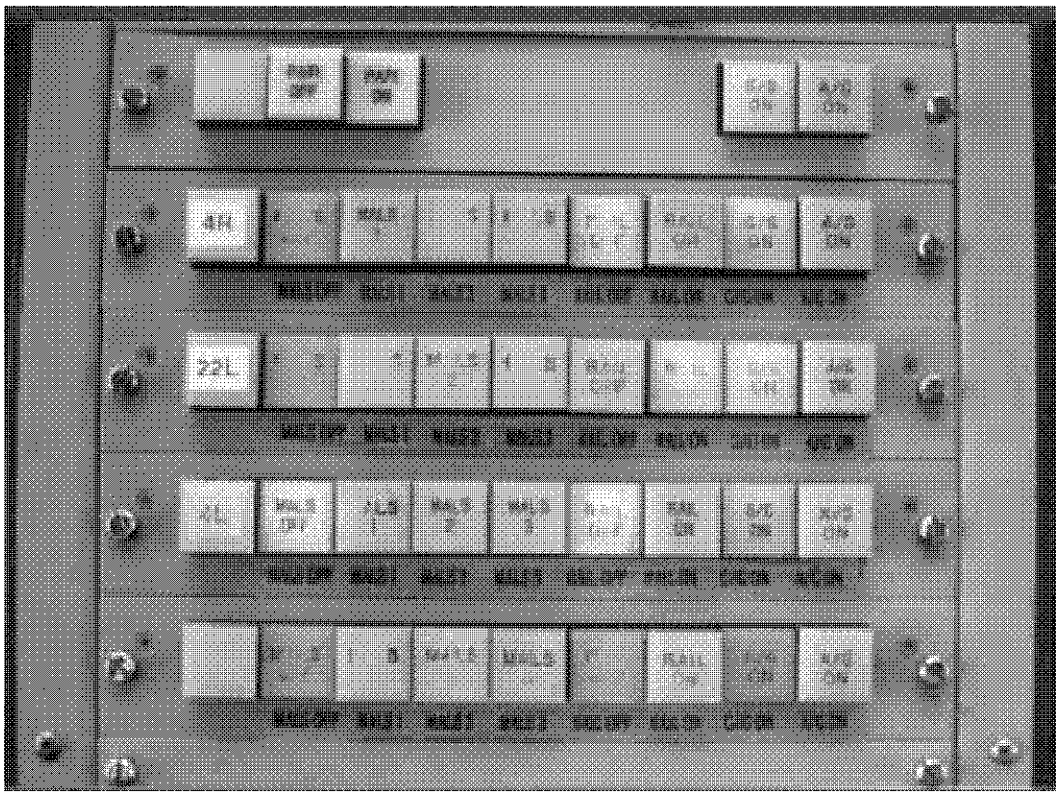

Photo 6: LIT approach lighting control panel

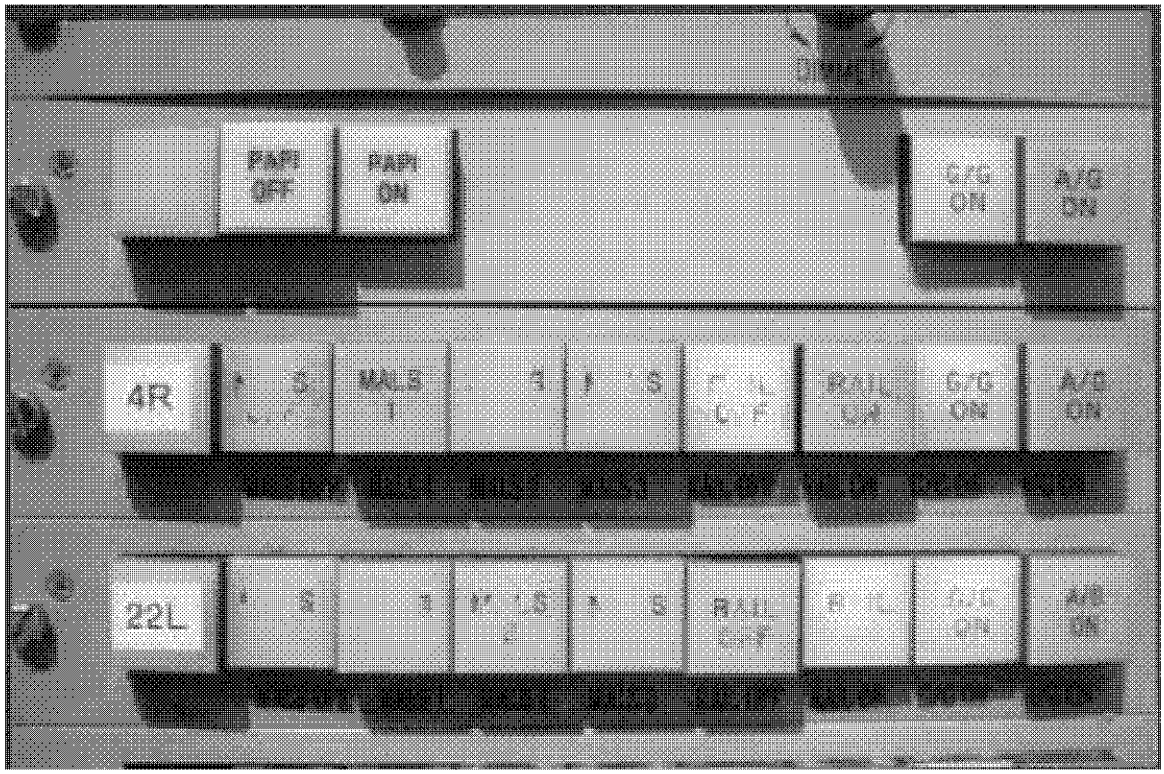

Photo 7: Closeup of runway 4R / 22L approach light controls

Low Level Wind Shear Alert System Information

LIT ATCT is equipped with a low-level wind shear alert system that uses sensors around the airport to warn controllers of wind shear occurrences. There are two displays in the tower cab, located at the LC1 and ground control positions. (Photo 8) Each display has six rows. The top row shows the center field average wind direction and speed. This is normally the source of wind data reported to aircraft by the local controller. The second through sixth rows normally display a value only when a wind shear alert occurs, showing the controller the wind velocity and direction readings from each sensor contributing to the alert.

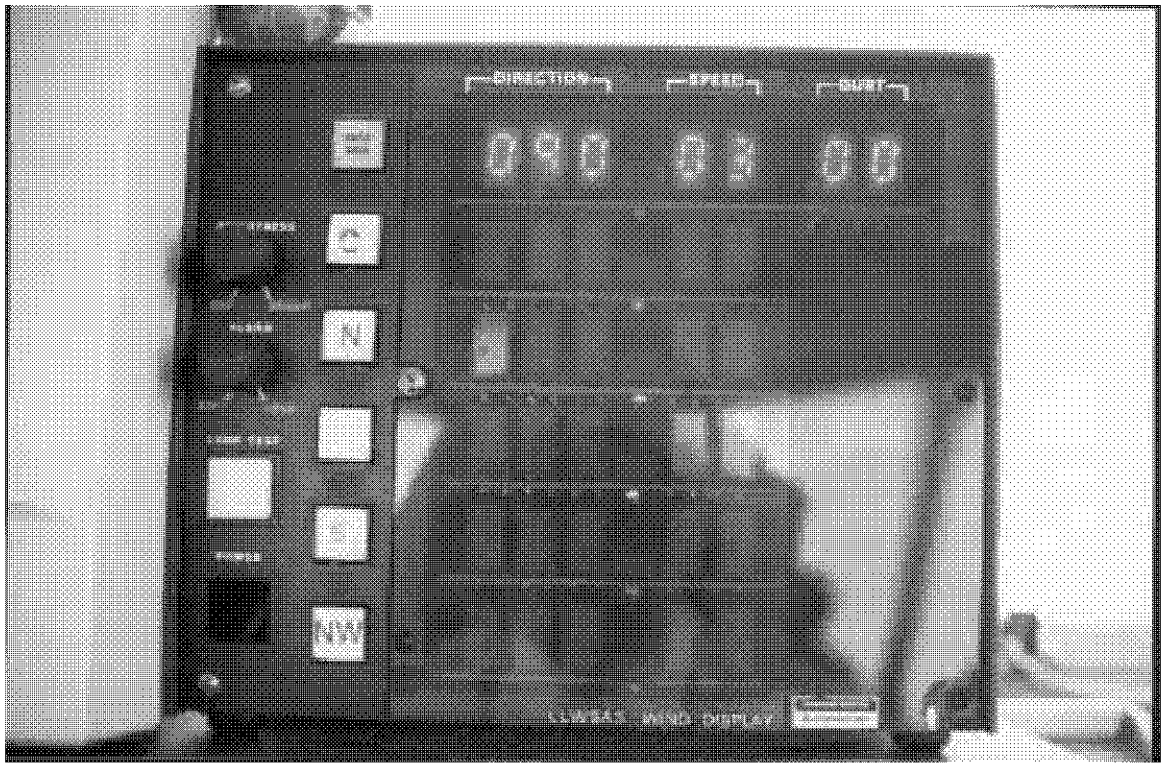

Photo 8: Low Level Wind Shear Alert System display.

D. FOLLOWUP INTERVIEW WITH KENNETH KAYLOR

On August 2, 2000, the ATC group met with Kenneth Kaylor, local controller on duty at the time of the accident, to ask further questions regarding his role and observations during the arrival of AAL1420 at LIT on June 1, 1999. Mr. Kaylor was represented by Mr. Mark Baylen of the FAA's Office of General Counsel, and provided the following information in response to questions. This is not a transcript, but is a "best effort" record of the questions and answers as obtained from group notes.

Question: On what wind measuring device did you base your wind reports to Flight 1420? (LLWAS, direct dial, ASOS)

LLWAS. I'm not sure of the precise source of the reading as far as which sensor(s) it comes from.

Question: You issued an NWS weather warning to a Centurion at the beginning of the transcript: where did the warning come from?

The weather warning come out of the IDS 4 system in the tower. I'm not sure how it gets in there – I believe it comes from NWS, but I don't know how. I don't recall exactly how

attention is drawn to new warnings – I believe there is some kind of visual alert when the IDS page is updated.

Question: What are the requirements of FAA Handbook 7110.65 or the LIT Facility Handbook when a weather warning from the NWS is received?

Doesn't know of any requirements about how to handle the NWS products.

Question: Did you receive any weather information from the North Little Rock NWS Forecast Office on the night of the accident?

Yes.

Question: Had you ever received weather reports from the North Little Rock NWS Forecast Office prior to the night of the accident while on duty?

I'm sure I have.

Question: By what means did you receive the information on the night of the accident? Is it normal to receive this type information from the North Little Rock NWS Forecast Office?

I got it from a page in the IDS-4 system. Yes, it's normal to receive these messages.

Question: Did you relay this information to Flight 1420?

No.

Question: Did you relay this information to other aircraft? Why?

I gave it to the Centurion because he was in the area covered by the advisory. AAL1420 wasn't even on the scope at that time, but their route of flight was not in the area covered by the advisory. AAL1420 was coming from the south.

(Mr. Kaylor was shown a printed NWS weather advisory issued on 6/2 at 0417 UTC. He stated that it was consistent with the information he gave the Centurion.)

Question: Does this NWS advisory cover the area of any of AAL1420's flight?

I'm not sure. The area of the advisory is all north of LIT – and that is where the Centurion was.

Question: When Flight 1420 first checked in with you that evening, was it raining?

I don't believe it was.

Question: When did it start raining that evening?

I don't know exactly – the first time I really noticed it was when I told AAL1420 that there was heavy rain on the airport.

Question: How would you describe the rainfall prior to and at the time Flight 1420 landed?

At the time he landed I think it was raining pretty hard. It was raining heavily at the time I told him about it (23:46:52) and continued to rain hard for 15-20 minutes.

Question: When the storm moved through just prior to the accident, was there a rapid change in the weather conditions?

The wind picked up, the visibility dropped, and it started raining.

Question: How long before the aircraft landed did the change occur?

About the time that I told him about the heavy rain at 23:46:52.

Question: What did you mean when you told the pilot that there was a thunderstorm just northwest of the airport moving through the area, i.e., moving toward the airport, north of the airport, etc.?

There's a thunderstorm out there and it appeared to be moving toward the airport – I don't recall exactly what I meant, except that there was a thunderstorm out there and it appeared to be coming toward us.

Question: Did the crew seem to be aware of the storms in the area?

They told me (23:34:24) "yeah we can see the lightning," so I assumed they could see what I was telling them about. At 23:39:07 I asked them how it looked on their equipment, and they told me it looked a little farther off than I thought. When they were out on down wind (23:45:46) they told me that, "they were getting pretty close to this storm." So yes, I think they knew about the storms.

Question: At what point (range and altitude) could you see Flight 1420 on its final approach for 4R?

Altitude, I don't remember – range, ½ - ¾ mile, something like that, the best that I can recall.

Question: At what point did you lose visual contact with Flight 1420 after touchdown?

Right around taxiway T, somewhere in that area.

Question: From which RVR location was the 3000' RVR and the 1600' RVR report derived?

The reading came from the LC1 RVR display. He stated that he believes touchdown and rollout were both identical and reading 3000 feet / 1600 feet when reported.

Question: What step were the runway lights on when the aircraft landed?

I don't remember.

Question: At 0444 the runway 4R lights were automatically logged as being set on step 3. Did you change the setting between then and AAL1420's arrival?

Doesn't recall whether changed setting or not. Changing lights is a routine thing – it's something we just do, and I don't recall any memory jogger occurring to make me recall changing them.

Question: What was your visibility in the tower when you issued the 3000' RVR report? What was it when you issued the 1600' RVR report?

When I issued the 3000 RVR report, tower visibility was less than 1 mile. I don't specifically recall the tower visibility when I issued the 1600 report.

Question: You reported RVR as a single value. Under what circumstances are you required to issue more than one RVR value?

(Refers to FAA Order 7110.65 "Air Traffic Control"…) Paragraph 2-8-2(b): issue midpoint and rollout when touchdown RVR is less than 2000 and the touchdown reading is greater than the rollout RVR.

Question: On night of the accident, were you required to give more than one value with these RVR reports?

For the 3000 foot report, I was only required to give one value. On 1600, the touchdown and rollout readings were the same so I only had to give one value.

Question: If you only have to give one value, do you have to identify the source or location (touchdown, midpoint, rollout?)

No.

Question: Did you have any reason to think that the RVR values displayed were inaccurate?

No, because when I looked out I couldn't see part of the runway. There was some kind of obscuration: I couldn't tell exactly what it was, but I had no reason to doubt that that RVR reading was correct.

Question: Ever had an experience where you thought the RVR value being reported was incorrect?

None that I can recall.

Question: Is there any guidance on what to do when the reported RVR values differ from the actual conditions within the area of the transmissometer?

Yes – the 7110. 65 address that. Paragraph 2-8-2(3).

Question: Are you familiar with the term "runway contamination"?

I don't believe that I am.

Question: Have you ever known runway 4R/22L to flood or accumulate standing water during rainstorms in the past?

I've never heard of that happening – don't think so.

Question: What sources are you permitted to use to obtain information on runway surface conditions? (refers to 7110.65)

Reports received from pilots and vehicles. The 7110.65 says I can use pilot reports and reports of the conditions received from airport management.

Question: Did you have any factual information on the condition of the 4Rrunway surface at the time of the accident?

I had not received any braking action reports from any pilots, and the airport management had not called with any information.

Question: Have you ever gotten calls from the airport management before about surface conditions?

No – I don't recall receiving any. If they call the tower, they usually talk to the supervisor on duty.

Question: Have you ever asked the airport management to check the runway and report on its condition?

I don't think so.

Question: Have you ever been working when a runway check requested by someone else was in progress?

I can't recall that occurring.

Question: Who can or usually reports runway contamination or a flooded runway situation?

I've never been at work when that condition was occurring.

Question: Are you supposed to timely notify pilots of flooded or contaminated runway conditions?

I'm not sure if it's required, but I would tell them if I knew about it whether it's required or not.

Question: What else are you supposed to do in that situation?

I would notify airport management.

Question: Do you have authority to close a runway that is contaminated by water or snow?

No. I don't have authority to close a runway, period.

Question: Did you give Flight 1420 any information concerning the condition of the runway surface, i.e., that there was standing water on the runway or the runway was flooded?

No. I had told them that there was heavy rain on the airport, and I had no other information available to give them about the runway condition.

Question: How long after Flight 1420 touched down did you realize that there might be a problem with the aircraft?

I told them to report clear of the runway at 23:50:54, but received no answer. That's not uncommon, so I waited to give them time to do what they have to do – checklist, etc. I then called again, with no answer. I was starting to get concerned a little, so I called again – no answer. I probably called the crash crew to go look for the aircraft between the radio transmissions made at 23:51:31 and 23:52:22. Before I called crash crew, I called Mike Holland to come to the cab. I then immediately picked up crash phone to call the ARFF crews. When the fire department answered, I said something like, "this is the control tower, I've just had an American MD80 land on 4R, I can't see him and he's not talking to me – would you please make sure he's OK." Then FD person said something about the electricity being out and that it might take a minute or two to get the doors up. I hadn't been off the crash phone very long when Holland showed up – he got there real fast.

Question: How long was it from the last time you saw the aircraft until you called ARFF?

Estimating: about a minute and 30 to 45 seconds. I called the between either the transmissions made at 23:51:31 and 23:52:00, or 23:52:00 to 23:52:22.

Question: Where was Flight 1420 the last time you saw it on the runway?

Passing the area of taxiway T.

Question: Did you tell the ARFF crews where you last saw the aircraft?

On the phone, I just told them that he landed on 4R.

Question: When you were talking to ARFF, did you know there had been an accident?

No. I had a suspicion that something was wrong, but I didn't see smoke or fire or any indication of trouble with the aircraft. I couldn't see anything out there [where the plane was] until the rain stopped.

Question: Have you received any training on how and/or what to communicate with the ARFF units or use standard terminology and geographical reference points?

The ARFF crews have spots they go to on the airport when we call them out. I don't know how they decide where they go – we tell them which runway an aircraft is going to land on, and they then tell us which spot they're going to.

Part of the LIT ATCT training program includes ARFF vehicle callsigns and definitions of Alert I, II, and III conditions. I don't recall any additional training, but there may be some in the LIT training order.

Question: Did you see any water or water spray displacement from any of the tires during Flight 1420's landing rollout? Did you see any water or water spray displacement forward of the engines during Flight 1420's landing rollout?

I saw the aircraft touch down, but I don't remember seeing any spray off the aircraft.

Question: Did you see whether Flight 1420's wing spoilers deployed or "popped-up" upon touchdown or landing rollout?

I don't remember seeing that.

Question: Even under normal conditions, would you be looking for spoilers?

No. Our training is just to watch the aircraft touch down, clear the runway, and taxi.

Question: Are there any local directives about distribution of NWS weather products?

Can't recall any: I don't remember any if there are some.

Question: Does the DBRITE radar in the tower cab provide any information on the intensity of weather?

No – there is no intensity information available. You just see the outline of the weather area.

Question: If tower visibility declines, are you required to take any actions?

Yes – if tower visibility declines, you're supposed to take a tower visibility observation and report the value to the contract weather observer. I'm not sure if this happens when the visibility is at four miles or less than four miles, but when it happens we're supposed to put the value in the IDS as a tower visibility observation. I don't know that we get any acknowledgement that observer has received it.

Question: Are you a certified weather observer?

No, I'm not certified as an official observer. I was a certified LAWRS observer in the past at Midway Airport, but not current since 1992. I'm not allowed to do official weather observations.

Question: On what did you base the "less than one mile" visibility report?

I did a quick scan around the tower, and could barely make out the west ramp. I believe the west ramp area is about 7/8 of a mile from tower.

Question: Was the RVR variable, going up and down?

No. After issuing the 3000 foot report, it went down. I don't not recall any variability, but I was doing other tasks besides just watching the RVR display: scanning out window, looking at DBRITE, etc.

Question: Any local procedures directing ATC to obtain runway condition reports under certain conditions?

No. But even if there had been, by the time heavy rain began, there wasn't enough time to get a runway check done before the aircraft arrived.

Question: Did you have any specific information on the condition of runway 4R?

No – I had no pilot reports and no information from airport management.

Question: Under what conditions are you required to provide braking action advisories?

When pilots report that braking action is poor or nil, or runway conditions are rapidly changing.

Question: Did this weather require braking action advisories?

Well, it was rapidly changing, but I didn't have time to change the ATIS.

Question: Assuming that this weather qualified as rapidly changing, are there any advisories that you were required to give the crew?

The 7110.65 says that, "If no report has been received for the runway of intended use, issue an advisory to that effect."

Question: Do you think that the pilots of AAL1420 were aware that the conditions on the field were rapidly changing?

Yes. In the past, I have also had other pilots ask if there are braking action reports available.

Question: Have you had crews ask for braking action reports during rainstorms?

Yes.

Question: Are there any local directives about approach light settings other than the requirements in the 7110.65?

I don't think so.

Question: What setting were the approach lights on when AAL1420 landed?

When the crew requested runway 4R, I had to do two things: switch the 4R localizer on and turn on the approach lights. I stepped up the lights (we're trained to step up from 0 to 1 to higher levels, not go directly to step 2 or 3, to protect system from damage) and turned on the RAIL as well. I don't remember the setting used, but I've done this many times and it's very routine.

Question: What setting were the runway lights on when AAL1420 landed?

There is a setting chart by the light control panel, but I don't remember what they were set on at the time. Referring to the 7110.65, with visibility less than a mile at night, the runway edge lights should be set on step 4.

Question: With an arriving aircraft on the ILS, how close can you allow an aircraft to get before the runway must be clear of vehicles?

Referring to the 7110.65, when the ceiling is less than 800 feet or the visibility is less than two miles, "Do not authorize vehicles or aircraft to operate in or over the critical area whenever an arriving aircraft is inside the ILS outer marker unless the arriving aircraft has reported the runway in sight or is circling to land on another runway."

Question: Does that paragraph apply to AAL1420's arrival?

Yes.

Question: What are your considerations when issuing a landing clearance?

Ensuring that runway is clear of other aircraft, vehicles, or equipment on the runway that would inhibit an aircraft from making the landing.

Question: When issuing landing clearance, if you were aware of any potentially hazardous conditions on the landing surface, what would you do?

I would advise the pilot of the condition along with landing clearance.

Question: Were you aware of any weather information that was relevant to this aircraft's arrival that you didn't give to the pilot?

I believe I gave the crew all the information I could to help them make a decision on whether to land. I told them about the wind, rain, decreasing RVR , thunderstorms, wind shear alerts, and decreasing visibility.

Question: Did you inform AAL1420 on initial contact that there was a thunderstorm ?

Yes, I did. They told me they could see the lightning.

Question: There was a dialog there at about 0439 when the crew acknowledges the storm. In your experience as a controller, do thunderstorms remain stationary?

No.

Question: Do you expect that crews will use their on-board weather radar if it's working?

Yes – their equipment is better than ours – when there is weather in the area, usually we let them use their radar to choose a path and tell us what they need to do. When the crew said that the thunderstorm was there but it was a little further off than I thought, it told me that my ASR equipment was not quite accurate.

Question: Ever seen an air carrier divert to an alternate because of weather?

Yes, I have.

Question: At 0434 you said, "I'll have new weather for you in a moment I'm sure." What did you mean by that?

I was expecting a special observation to come out because the weather was coming.

Question: Who generates the special weather observation?

The contract weather observer.

Question: Are you qualified to determine prevailing tower visibility?

Yes, I have a tower visibility certificate.

Question: Would you expect the runway to be wet with heavy rain falling?

Yes.

Question: Before AAL1420 arrived, did any other aircraft land on runway 4R during your shift?

No.

Question: How long had you been working on the LC1 position?

About 45 minutes or so.

Question: Do you have the authority to close a runway?

No - only airport management can close a runway. I don't have that authority.

Question: In your training and experience, is wind shear a hazard to aviation?

In my experience and training I've heard some pretty rough stories about flight operations in wind shear.

Question: In your experience, have you had any air carriers abandon approaches because of wind shear?

I'm not sure if I have, but I've had crews go hold because of wind shear alerts -–they requested to just go wait.

Question: What category is the ILS for 4R?

I can't recall.

Question: Do you know what the 4R ILS minimums are?

I can't recall exactly, but I believe the minimum RVR requirement is 2400 feet.

Question: Where are you located when you take a prevailing visibility observation?

In the tower.

Question: Do you know where the 4R RVR transmissometers are?

No.

Question: Have you ever seen the RVR differ from prevailing visibility?

They're totally different things: I've seen prevailing visibility differ substantially from RVR. Conditions like ground fog can cause RVR to be much lower than tower visibility because the fog may be in a thin layer.

Question: Do thunderstorms reduce RVR?

I don't recall specific instances, but precipitation reduces RVR.

Question: When you lost sight of AAL1420 and called the fire department, did you have enough information to determine alert level?

I didn't know for certain that there had been an accident. Determination of alert levels is the fire department's responsibility.

Question: Have you ever canceled an approach clearance or withdrawn a landing clearance because of weather?

No.

Question: How was the visibility after the fire trucks came out?

The visibility stayed pretty much the same after AAL1420 landed. Whatever obscuration was out there remained until about 0010. I couldn't see the departure end of 4R until at least 10 to 15 minutes after the hour.

Question: At 0446:52 you told AAL1420 that the weather had deteriorated. Were you anticipating a special observation report because of weather?

Yes, I was. My best recollection is that we next got a weather report at about 0453.

Question: Are there any rules allowing you to deny landing clearance because of weather?

Not to my knowledge.

Question: How do you rate your service to AAL1420?

As far as I'm concerned, my job is service. I did everything I could do and was required to do and more to tell that crew what they needed to know to decide whether to land.

Question: Was the crew aware of the weather?

Yes. They told me that the saw the lightning, at 0439 they told me that they thought the storm was a little farther off than I thought, and at 0445:46 they said that they were getting pretty close to the storm. I believe that this crew knew there was a thunderstorm present: there is no doubt in my mind.

Question: If weather goes below the minimums for an approach, is it ATC's responsibility to not clear the aircraft for an approach, or is it the pilot's responsibility to determine whether approach can be continued?

I provide information, and the pilot makes the decision.

Question: If you had heard an emergency locator transmitter, would you have known about the emergency?

Yes, but I didn't hear one.

Question: Do you know any controllers who think they have authority to close a runway?

No, but if I did I'd correct them.

Question: Do you know why the 4L ILS was out of service?

No.

Question: Why didn't you testify at the hearing in January?

I didn't testify on the recommendation of my doctor.

Scott J. Dunham
Air Traffic Control Group Chairman