NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety – Central Region
Denver, Colorado

Survival Factors, Airport, Emergency Response, and HAZMAT Factual Report

A. ACCIDENT

Operator:	Empire Aviation
Location:	Lubbock, Texas
Date:	January 27, 2009
Time[1]:	0437 Central Standard Time
Aircraft:	Aerospatiale Alenia ATR-42-320
NTSB Number	CEN09MA142

B. GROUP

Chairman:	Jennifer S. Rodi National Transportation Safety Board Denver, Colorado
Member:	William Mitchell Federal Aviation Administration Fort Worth, Texas

C. SUMMARY

On January 27, 2009, at 0437 central standard time (CST), N902FX, an Aerospatiale Alenia ATR-42-320, operating as Empire flight 8284, sustained substantial damage when it collided with terrain short of the runway while executing the Instrument Landing System (ILS) Runway 17R approach at Lubbock Preston Smith International Airport (LBB), Lubbock, Texas. The airplane was registered to Federal Express Corporation, Memphis, Tennessee, and operated by Empire Airlines, Hayden, Idaho. The airline transport pilot rated captain was seriously injured and the commercial rated first officer sustained minor injuries. An instrument flight rules flight plan was filed for the flight that departed Fort Worth Alliance Airport (AFW), Fort Worth, Texas, at 0319. Instrument meteorological conditions prevailed for the supplemental cargo flight operated under Title 14 Code of Federal Regulations (CFR) Part 121.

D. DETAILS OF INVESTIGATION

Exterior Documentation

[1] All times herein are local time and based on the 24-hour clock unless otherwise noted.

According to the Airworthiness Group Chairman Factual Report the entry and cargo doors opened and closed using the inner and outer handles. The escape hatch was found loose within the recovered wreckage. The inner and outer handles worked when manually actuated and no anomalies were noted with the hatch.

Interior Documentation

The interior of the cockpit, including overhead panels, instrument panels, and circuit breaker panels, was charred and blackened due to exposure to heat and fire. There was no apparent damage to the instrument panel or dashboard due to impact.

Pilot's Seat

The left seat remained attached in its design mounting location. The seat was equipped with a four point harness with a center buckle and turn release mechanism. The center buckle and turn release mechanism functioned as designed. The two-section lap belt and the shoulder harnesses remained attached at their design mounting location. The seat slid forward and aft in its seat track as designed.

The two lap belts were threaded through the seat cushion cover on either side. The right side of the lap belt webbing was threaded incorrectly through the metal buckle portion of the right side assembly. The data tag was missing on the right side lap belt. The right lap belt webbing exhibited slight stretching of the webbing material at the buckle location.

The left lap belt webbing exhibited slight stretching of the webbing material at the buckle location. The data tag on the left side lap belt contained the following information: Pacific Scientific Belt – 45402 – Duarte, CA, PN 1101812-01 – NA0108900-019 – FA 0108900-17 – LB RT STR 1,600 lbs – Date of Mfg 02/05 – Conforms to FAA TSO C22f.

The right side of the shoulder harness was draped across the seat back and was unremarkable. The left side of the shoulder harness was draped along the front of the seat back and the webbing exhibited slight stretching of the webbing material. The inertial real for the left seat shoulder harnesses locked when a down and forward force was rapidly applied.

The seat cushion was removed and the seat pan was unremarkable. The seat pan data tag contained the following information: IPECO Europe LTD – Seat Pilot – ATR 42 – PN 3A063-0036-03-4 – Issue 4 – SN 14313 – Model 0A063-0049 – Mfg Date 20.2.90 – TSO No C39a.

First Officer's Seat

The right seat remained attached in its design mounting location. The seat was equipped with a four point harness with a center buckle and turn release mechanism. The center buckle and turn release mechanism functioned as designed. The two-section lap belt and the shoulder harnesses remained attached at their design mounting location. The seat slid forward and aft in its seat track as designed.

The two lap belts were threaded through the seat cushion cover on either side. The right side lap belt data tag contained the following information: AMSAFE – Final Assy # - 1180010-405-101 – Item Assy Lap Belt Half – Batch No SO8365104 – Part Number 1150011-608-010 – FAA TSO C-114 – Rated Strength 3,000 lbs – Date Mfg 9/08. The right lap belt webbing exhibited slight stretching of the webbing material at the buckle location.

The left lap belt webbing exhibited slight stretching of the webbing material at the buckle location. The data tag on the left side lap belt contained the following information: AMSAFE – Final Assy # - 1180010-405-101 – Item Assy Lap Belt Half – Batch No SO8365103 – Part Number 1150011-608-010 – FAA TSO C-114 – Rated Strength 3,000 lbs. The date of manufacture was not legible.

The left and right sides of the shoulder harness were draped along the front of the seat back and exhibited slight stretching of the webbing material. The inertial real for the left seat shoulder harnesses locked when a down and forward force was rapidly applied.

The seat cushion was removed and the seat pan was unremarkable. The seat pan data tag contained the following information: IPECO Europe LTS – Seat – Co-Pilot – ATR 42 – Part Number 3A063-0080-02-2 – Issue 3 – Serial Number 11364 – Mfg Date 17.12.88. Model No-0A063-0084 – TSO No C39a.

Please refer to the Operations and Airworthiness Group Chairmen's Factual Reports for documentation of the cabin, and emergency equipment.

Lubbock Preston Smith International Airport

Lubbock Preston Smith International Airport (LBB), was a Class I[2] public airport located in Class Charlie airspace, 4 miles north of Lubbock, Texas, at 33 degrees, 39 minutes, 82 seconds north latitude and 101 degrees, 49 minutes, 37 seconds west longitude, at a surveyed elevation of 3,282 feet. The airport had three runways; Runway 17 Right (R)/35 Left (L) (11,500 feet by 150 feet, concrete),

[2] CFR Part 139.5 defines Class I airport as "an airport certificated to serve scheduled operations of large air carrier aircraft that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft."

Runway 8/26 (8,001 feet by 150 feet, concrete), and Runway 17L/35R (2,891 feet by 75 feet, asphalt).

Twelve instrument approach procedures were available at the airport. These instrument approaches included four area navigation (RNAV)/global positioning system (GPS) approaches (Runway 08, Runway 17R, Runway 26, and Runway 35L), two instrument landing system (ILS)/localizer (LOC) approaches (Runway 26 and Runway 17R), one HI-ILS approach (Runway 17R), one HI-LOC/distance measuring equipment (DME) back course approach (Runway 35L), one LOC back course (Runway 35L), one HI-very high frequency omni-direction radio-range (VOR) approach (Runway 26), and one VOR-A approach. The airport also had radar approach procedures available.

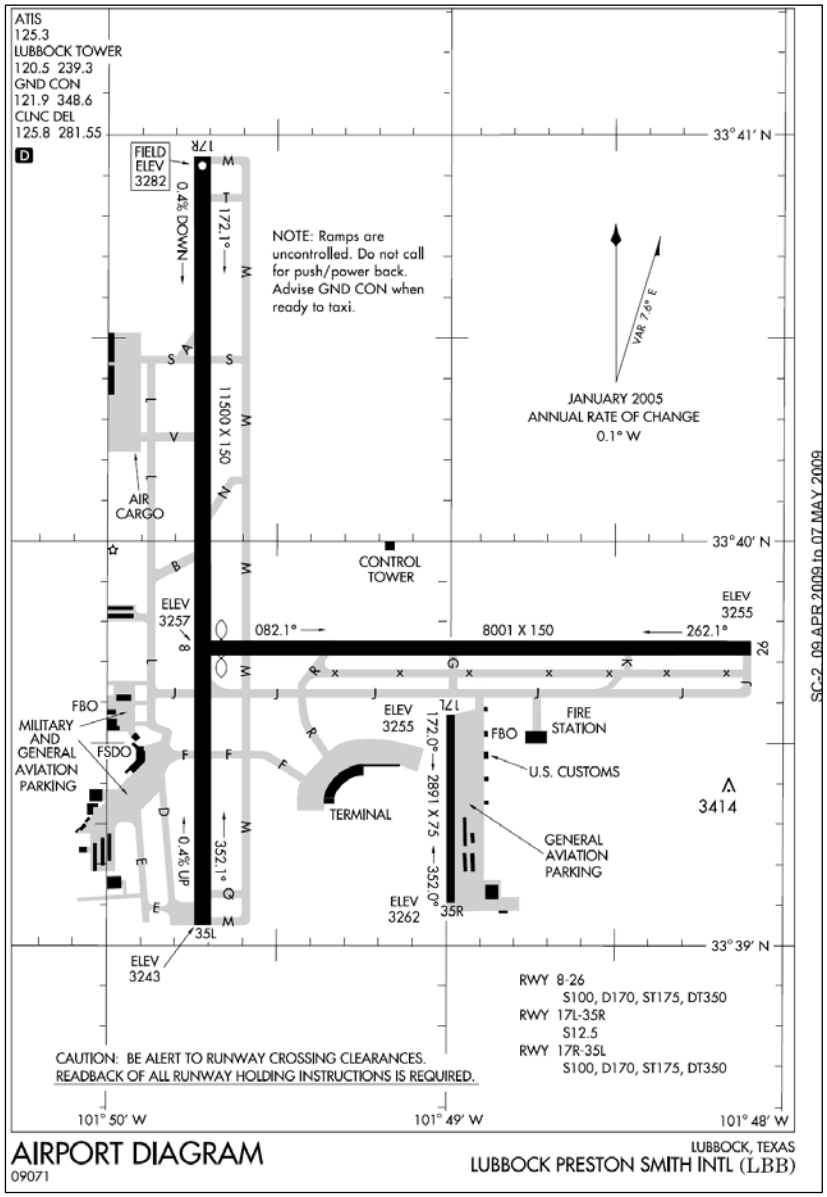

Figure 1. LBB Airport Diagram

Airport Certification

The Federal Aviation Administration (FAA) conducted an “annual certification safety inspection” of LBB on April 22 through April 24, 2008. The letter issued by the FAA indicated that the airport was "being operated in full compliance with the requirements of the Federal Aviation Regulations Part 139, the Airport Certification Manual, and the Airport Operating Certificate." The FAA did not issue letters of correction as a result of the inspection.

The FAA conducted a “periodic inspection” of LBB on February 28 through March 2, 2007. This inspection revealed that the airport was not in full compliance with the requirements of Federal Aviation Regulations Part 139 or the Airport Certification Manual with regard to Aircraft Rescue Fire Fighting (ARFF) recurrent training records, and fueling agent inspections. These items were corrected during the inspection.

Snow and Ice Operations

According to LBB's snow and ice operations plan, it was the responsibility of the operations supervisor, operations agent on duty, or maintenance supervisor to monitor the runway and taxiway environment and determine when snow and ice removal was necessary and warranted. Sensors were embedded at various points on Runway 17R/35L, Runway 8/26, and on Taxiways Juliet, Mike, and the terminal ramp. These sensors detected surface temperature, sub pavement temperature, and moisture collected on the paved surface and was relayed to the airfield maintenance building for monitoring. According to airport procedure AF-7, between the hours of 2100 and 0500, airport police will perform airfield inspections and report the results to the operations dispatcher.

According to the snow and ice operations plan, "prefreezing application will tend to keep any precipitation from freezing on the surface thus facilitating ice control. In the event that ice forms on the airport operational surfaces, the standard procedure would be to spread urea if ambient temperature is steady at 19 degrees or above. Below this temperature the melting action of urea becomes less effective." "Granulated urea will be applied to the first priority airport operational surfaces…during critical temperatures if moisture or precipitation is occurring or is expected to occur." First priority airport operational surfaces include the "active runway favored by weather conditions, associated parallel taxiway, taxiways connecting the active runway to the terminal ramp and the established ARFF road from the fire station to Taxiway Juliet." The plan and its procedures were consistent with the guidance provided in FAA Advisory circular 150/5200-30C.

According to the airport snow and ice event log for the day of the accident, at 0100 an airport truck spread urea on Runway 17R/35L, the ramp, and Taxiways

Romeo and Juliet. At 0220 an airport truck spread urea on Runway 17R/35L, and Taxiways Mike, November, Victor, and the east and west sides of Sierra. The air temperature at 0330 was recorded as 17 degrees and the surface temperature was noted as 23 to 24 degrees. The following table reflects the Airfield Condition Report Log information for the day of the accident.

Time	Location	Touchdown Zone Average[3]	Mid-Point Zone Average	Roll-out Zone Average	Air Temperature	Ground Temperature	Visibility	Remarks
2335[4]	17R	49	45	46	-5 °C	-[5]	2 miles	None
130	17R\35L	49	45	46	-	-	-	None
130	08\26	46	48	44	-	-	-	None
210	35L	21	28	28	20°F	25°F	2 miles	None
410	35L	24	25	23	16°F	23°F	2 miles	Ice Rwy

Table 1. Airfield Conditions Report Log

Airport Emergency Plan

According to the Airport Emergency Plan for LBB "The purpose of the Airport Emergency Plan (AEP) is to provide guidance to those individuals having airport responsibilities to minimize the possibility and extent of personal injury and property damage in an emergency at the Lubbock International Airport..." The most recent version of the AEP was submitted on May 24, 2007, and was approved by the FAA on June 14, 2007. The FAA approved the most recent revisions on July 9, 2008.

The AEP for LBB stated that "all responding units… within the confines of the Airport must assume that the airfield remains operational… all emergency vehicles must remain within, or be under the control of a vehicle maintaining two-way communications with the ATCT prior to proceeding on the runways and taxiways." It continued to state that "unless otherwise prescribed or directed, primary entry points to the airfield by responding units will be at Gate 6 and Gate 48 or at a location prescribed by the command post." The AEP reiterated this point in several locations. In addition, it stated that the "Battalion Chief will set up the initial staging area/command post near Gate 6, Gate 48, or another designated area."

Section 1, Page 1 of the AEP provided a list of carriers and operators at LBB whom hold a copy of the AEP. Federal Express was included in this list. Section 12, Page 1 of the AEP, entitled “Call List” exhibited a list of airlines, local law enforcement, emergency management, FAA, and Federal Bureau of Investigation

[3] The touchdown zone average, mid-point zone average, and roll-out zone averages are all Tapley readings.
[4] This reading was taken on January 26, 2009, the evening prior to the accident.
[5] Readings left blank in the table illustrate information that was not recorded on the log.

contact telephone numbers. The contact information for Federal Express was not included on this list

The last full scale event that exercised the plan was held on May 15, 2008, in compliance with Title 14 CFR Part 139 requirements. The event simulated the crash of a large commercial airplane. Comments from the disaster drill evaluators commended the incident command structure, communications, and coordination of emergency responders. One evaluator noted that a request for a HAZMAT manifest was not made. In addition, logistics created difficulties in accounting for all of the passengers. In this simulation, the airport was NOTAMed "closed" for simulation purposes only. The airport's participants list for the drill did not include each participant's affiliation. Neither Federal Express nor the FAA participated in this drill.

Prior to this event, a tabletop exercise was held on May 24, 2007. The event simulated the crash of a large commercial airplane while landing. Once the simulation started, it was stated that "required NOTAMs would be issued regarding applicable airport closure…" The airport's participant list for this tabletop exercise did not indicate that the FAA or Federal Express participated in this drill.

NOTAMS

LBB issued a Notice to Airmen (NOTAM) at 0045 closing Runway 8/26 "until further notice." According to airport personnel, this was due to the icy runway conditions. An additional NOTAM was issued at the same time noting "loose snow and patchy ice" on all taxiways at LBB. LBB issued a NOTAM at 0410 closing runway "35L until further notice." The NOTAM was amended at 0440 to read that runway "17R/35L was closed."

Sequence of Events

The following table is a compilation of recorded information from the FAA air traffic control tower transcripts (ATC)[6], dispatch records from the City of Lubbock Fire Department (ARFF), and various records and logs from LBB. The chronological reference provided by this table accurately reflects the data from each source but does not synchronize the time variance between each source.

Time	Source	Entry
0:45:00	LBB	NOTAM closing Runway 8/26 issued
0:45:00	LBB	NOTAM advising of loose snow and patchy ice on all taxiways issued

[6] An equipment fault at Lubbock Air Traffic Control Tower caused the timestamp on recorded ATC audio and the official LBB ATC transcript to be 6 minutes and 25 seconds slow. Details on this error can be found in the ATC Group Chairman Factual Report.

1:00:00	LBB	Urea applied to Runway 17R/35L, Taxiway Juliet, and ramp
1:30:00	LBB	Tapley Readings taken on Runway 17R/35L
2:10:00	LBB	Tapley Readings taken on Runway 17R/35L
2:20:00	LBB	Urea applied to Runway 17R/35L, and Taxiways Mike, November, Victor, and Sierra
2:45:00	LBB	NOTAM reporting braking action for Runway 17R/35L issued
4:10:00	LBB	Tapley Readings taken on Runway 17R/35L
4:10:00	LBB	NOTAM reporting braking action for Runway 17R/35L issued
4:15:00	LBB	Urea application initiated on Runway 17R/35L
4:27:46	ATC	Accident airplane cleared to land on Runway 17R
4:31:43	ATC	ATC stated that they cannot get a hold of the fire department
4:32:05	ATC	Airport Operations observed ARFF emerging from their station
4:32:11	ATC	ARFF R2 Called ATC for instructions
4:38:12	ARFF	Alert 3 announced in ARFF Station
4:40:00	LBB	NOTAM Closing Runway 17R/35L issued
4:42:31	ARFF	First ARFF response unit arrives on scene
4:55:56	ARFF	First Battalion Commander Arrives on scene

Table 2. Sequence of Events

Airport Personnel Interviews

Gary Loftus
Airport Operations Agent
January 31, 2009

Mr. Loftus had been with the airport as an airport operations agent since November of 2007. Prior to his employment with the airport he spent seven years as a business owner and 20 years as an air traffic controller.

He was sitting in his vehicle approximately 1,800 feet from the threshold of the approach end of Runway 17R on Taxiway Mike on the east shoulder of the taxiway. He had just measured the friction for Runway 35L utilizing a Tapley meter. He reported the results to the tower, and issued a NOTAM at 0410 to the airport operations dispatcher. He drove on Taxiways Mike, Tango, Sierra, and November to perform Tapley tests.

He reported that Runway 8/26 had been NOTAMed closed at midnight.

Air traffic control advised the maintenance personnel, who were applying urea to the runway, to exit the runway due to an incoming aircraft. He relocated to Taxiway Mike, approximately 1,800 feet from the threshold of Runway 17R to observe the airplane land. He had performed the Tapley readings for an airplane landing in the opposite direction of what the inbound airplane was landing. He

had performed the Tapley reading in this direction due to the prevailing winds and because Runway 35L was the active runway.

As he watched for the airplane he observed it come through the fog layer and it appeared that the airplane was high and right of the centerline. The airplane emerged approximately 400 to 500 feet above ground level. He believed he observed the airplane move slightly to the left but he was offset from the centerline and was not sure of his perception. He observed the airplane lights go towards him and then go back. He did not observe the nose of the airplane go down or drop. He stated that it looked as if the airplane was "pan-caking" in and motioned with his hand that the airplane appeared to fall for a period of time, flat, from the sky. The airplane rolled slightly to the right, rolled hard to the left in a near 90 degree bank, and then rolled to the right, impacted the runway and slid for a distance. As the airplane slid past him, a fire erupted and he could feel the heat from the flames in his vehicle. Flames were coming out of the right wing and it was "engulfed in flames" as it slid down the runway.

He immediately notified his supervisor of the accident and heard the crash phone beeping tones over his radio as the airplane rolled past him. He heard dispatch send airport police to gate 48 and he issued a NOTAM to close Runway 17R/35L.

He heard the ATC state that they were having difficulty contacting Aircraft Rescue and Fire Fighting (ARFF), yet very soon after, he observed the lights of the ARFF units emerge from their station. He stayed clear of the wreckage because he did not anticipate that anyone would be getting out of the airplane.

The air traffic control tower called stating that there was a pilot "walking around, lost" on the airfield. Airport Operations and ARFF initiated a search and it was later reported by ARFF that both pilots were en route to the hospital.

He notified airport management and did not plan to open Runway 08/26 prior to 0800. He coordinated with the ARFF captain around 0710 to ensure that the ARFF index was going to be met as soon as he opened the runway. The NOTAM for Runway 8/26 was lifted at 0845.

No NOTAMs were issued closing the entire airport. A departure scheduled for 0500 was cancelled due to runway closures. The decision to not close the airport was made because air carrier runways were closed, therefore, no operations could be conducted.

Rosendo Esquibel
Airfield Maintenance
January 31, 2009

The Lubbock Airport had employed Mr. Esquibel in airport maintenance for 12 years. Prior to his current position, he was an airport parking employee.

Prior to the accident he was spreading urea on Runway 17R for de-icing purposes, and was operating with the call sign "Maintenance 26." He was driving with one other maintenance vehicle for this operation. ATC called the airport maintenance vehicles and asked them to exit the runway due to an airplane inbound for landing. Both maintenance vehicles exited and cleared the runway environment at intersection Taxiway Bravo and waited "about five minutes."

Shortly after exiting the runway, they heard Maintenance 22 inquire about a "ball of fire" at the end of the runway. He looked towards the end of the runway and observed the fire. He heard the tower controller state that she could not contact the fire department and he volunteered to go to the fire department and notify them of the accident. Before she could respond he observed the fire department vehicles exiting their station.

He remained at his location on intersection Taxiway Bravo in order to stay out of the way and prevent a possible delayed response. His vehicle was equipped with an amber beacon light on the top and the headlights for the vehicle were on. He estimated that he was 3,000 feet away from the accident airplane.

He characterized the weather at the time of the accident as drizzling precipitation and cold temperatures. The visibility at the time of the accident was estimated at one mile and was restricted due to fog and drizzle. The runway and taxiway environment was slick due to ice on the surface.

He remained in position for approximately five minutes. He was then instructed to initiate de-icing activities for Runway 08/26. To his knowledge, the airport remained open during the entire event.

Eloy Moralez
Airfield Maintenance
January 31, 2009

Mr. Moralez had been employed by the airport in airfield maintenance since March of 2001. Prior to his employment with the airport he worked as a civilian at Reese Airfield.

Just prior to the accident he was spreading urea on Runway 17R/35L for deicing purposes. They had already performed one pass down the center of the runway, heading north on Runway 17R/35L and were performing a second pass, heading south, on the west side of the runway. As they were approaching the intersection the air traffic control tower ordered them to exit the runway for an incoming flight. He cleared the runway environment at intersection Taxiway Bravo and the airplane was cleared to land shortly thereafter. He continued on to the Taxiway Lima intersection to wait for the arriving airplane.

His vehicle passenger was facing towards the approach end of Runway 17R and asked him if he had "seen that." He turned around and observed a "large ball of fire." He called "ground control" and asked what it was and the controller responded that it was an airplane. The operations agent on duty asked if ARFF were on their way and she responded she was having difficulty reaching them. Immediately thereafter he observed the ARFF vehicles emerging from the station.

He continued to wait at his location until further instructions were relayed.

He stated that at the time of the accident it was dark, sleeting, and it was hard to see due to the freezing sleet and the fog which restricted the visibility.

Emergency Response

Aircraft Rescue and Fire Fighting (ARFF)

Lubbock Preston Smith International Airport is a Title 14 Code of Federal Regulations (CFR) Part 139 certificated airport. The ARFF capability was maintained at "Index C[7]." The City of Lubbock provided ARFF and Emergency Medical Services. The ARFF equipment and personnel were located at one central station just south of Taxiway Juliet, towards the midpoint of Runway 8/26. ARFF services were available 24 hours per day, 7 days per week and the station was staffed by a minimum of four firefighters. The station had the capacity for six firefighters. At the time of the accident, five firefighters were on duty.

The following ARFF vehicles were stationed at the LBB ARFF Station:

Rescue 2 (R2) – 2004 Oshkosh equipped with 1,500 gallons of water, 200 gallons of Aqueous Film Forming Foam (AFFF), and 450 pounds of "Dry Chem[8]." This vehicle utilized a roof turret, a bumper turret, and a hand line for the application of water and foam, and the roof turret and hand line for the application of dry chemical. Two professional firefighters staffed this vehicle.

Rescue 4 (R4) – 1996 Emergency One equipped with 1,500 gallons of water, 190 gallons of AFFF, and 450 pounds of Dry Chem. This vehicle utilized a roof turret, a bumper turret, and a hand line for the application of water and foam, and a hand line for the application of dry chemical. One professional firefighter staffed this vehicle.

[7] CFR 139.315 defines Index C as aircraft lengths "at least 126 feet but less than 159 feet in length. CFR 139.317 requires Index C equipment to have either three vehicles – one vehicle carrying either 500 pounds of sodium-based dry chemical, halon 1211, or clean agent, or 45 pounds of potassium-based dry chemical and AFFF application, and two vehicles carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by all three vehicles is 3,000 gallons."

[8] Potassium based dry chemical

Rescue 5 (R5) – 1996 General Motors Company Rapid Intervention Vehicle equipped with 100 gallons of AFFF and water[9], and 450 pounds of dry chemical. This unit was equipped with a hand line for the application of water, foam, and dry chemical. One professional firefighter staffed this vehicle.

Rescue 1 (R1 - Reserve Unit) – 1988 Emergency One equipped with 1,500 gallons of water, 190 gallons of AFFF, and 450 pounds of dry chemical. This vehicle utilized a roof turret, a bumper turret, and a hand line for the application of water and foam, and the roof turret and hand line for the application of dry chemical.

Dispatch – Communications

The ARFF station received notification of aircraft emergencies by the use of a "direct line radio" between the air traffic control tower (ATCT) and the airport fire station. ATCT will lift the receiver in the tower which results in an automatic tone sounded in the fire station. Once the tone sounds, ATCT personnel will relay the level of alert, and other required details. The LBB airport publications noted this as the activation of the alert network.

According to the Letter of Agreement between the LBB ATCT and the City of Lubbock, the tower shall activate the alert network when they deem necessary. There are three alert levels: one[10], two[11], and three[12]. Upon activation of the alert network, the air traffic control tower should provide the following information "as is available:" type of aircraft, nature of emergency, runway to be used, and any other information if time permits.

The crash line telephones were located in the office and four other locations within the fire station. The tones and instructions were also audible over the speakers in the station. The city dispatch and the airport communications center were simultaneously notified of the same alert. When activated, the tone sounded for six seconds and alternated between two different tones. ATCT then announced the type of alert and the location. There was no need to pick up the handset and respond to the tower. The Alert 3 was announced through all of the crash line telephones and the speaker systems within the station.

The alert for the subject accident was relayed in the normal manner through the use of the direct line radio. According to ARFF personnel, a tone sounded in the fire station followed by "muffled voices." There was no further information or

[9] Premixed at six percent
[10] “Alert 1is an approaching aircraft reporting a minor emergency or difficult.”
[11] “Alert 2 is an approaching aircraft reporting a major emergency such as unsafe gear, an engine out, fire warning, etc.”
[12] Alert 3 is an aircraft that “has crashed on or near the airport.”

instruction that followed. Shortly thereafter, a second tone sounded, and an Alert 3[13] was announced.

LBB ARFF procedures called for the lead truck, R2, to handle all communications with the airport ground control frequency. While R2 is handling this communication the fire captain will communicate with the city dispatch and the responding battalion chief via a second radio that communicates on the city radio frequency[14]. All of the ARFF vehicles had the ability to communicate on the airport frequency or the city frequency; however, they cannot monitor both frequencies simultaneously. During the response, ARFF units R2 and R4 remained on the airport frequency. R5 monitored both frequencies.

ARFF Response

LBB ARFF personnel were sleeping in their quarters when the alarm sounded. They were easily awoken by the alert tones in the station, dressed, and responded to their vehicles. Due to the lack of information following the first alert tone, it was initially unclear to them what the nature of the alert was. When the second tone sounded and information followed, the situation was rectified.

According to the dispatch logs from the Lubbock Fire Department, the alarm sounded at 0438:12 and the ARFF Rescue Units dispatched at 0438:46. Rescue Units arrived on scene at 0442:31. Additional Lubbock Fire Department units were dispatched at 0441:10 and arrived on scene starting at 0457:27.

The Safety Board Survival Factors Group Chairman interviewed the five ARFF staff who responded to the accident in addition to the battalion chief and battalion captain who also responded to the scene. A FAA airport operations inspector was present during those interviews. The following is a summary of those interviews.

George "Doug" Smith
Fire Captain - Rescue 5
January 30, 2009

Captain Smith had been the Fire Captain with LBB ARFF unit for 1.5 years. Prior to this position, he was an engine lieutenant at the training center. He held his ARFF certification for seven years and the subject accident was his first aircraft accident event.

Captain Smith was sleeping when he was awakened by the alert tones over the speaker system. He started getting dressed and headed towards the phone in his office which is adjacent to his sleeping quarters. He did not hear anything

[13] According to the AEP, an Alert 3 is an "accident on or near the airport. ARFF equipment will proceed immediately as directed by Tower."
[14] Currently the city is in the process of equipping the Battalion vehicle with an airport radio so that the airport information does not have to be relayed to the Battalion vehicle.

following the alert tones such as the level of the alert or instructions. He was able to hear background noise as if a line was "open." The alert tone sounded a second time, approximately 15 to 20 seconds after the first tone. Alert 3 was announced. He recalled hearing an Alert 3 and Runway 17 Right but did not recall any other information that may have been passed along by ATCT.

As he came out of his office to hit the control button he observed the other firefighters emerging from their sleeping quarters.

At the time of the response, he spoke with dispatch (on the city frequency) to ensure that stations Two, Five, and the 810 (battalion chief) were all responding to the accident. Unit 810 stated that emergency medical service (EMS) was responding. Only the ARFF Captain in R5 communicated with the supporting units on the city frequency. The other ARFF units remained on the airport frequency.

Before going to bed the evening prior to the accident, he noted that freezing rain and drizzle were forecast for that night. It was apparent that it had been "raining" prior to the accident and a "sheet of ice" was observed on the runways and taxiways. While driving R5, he accelerated in attempt to assess the friction of the road. No problems were noted but the response was conducted cautiously due to the presence of ice. It was foggy at the time of the response; however, visibility was not considered a problem.

The three ARFF units R2, R4, and R5 proceeded down Taxiway Juliet to Taxiway Mike. Captain Smith was able to observe smoke. After turning onto Taxiway Mike, he was able to observe the smoke and glow from the fire. R2 headed "cross country" approximately parallel from the wreckage and positioned due east of the wreckage. R4 positioned at the nose of the main wreckage and also started expelling agent, via the roof turret, onto the fire.

The fire was "blackened" down quickly. Once this took place, the "Federal Express" was observed on the tail of the airplane and it was then known that the airplane was a cargo airplane and not a passenger airplane. An attempt to access the airplane interior was made. One firefighter used a ladder to access the airplane cockpit via the roof hatch. He did not enter the cockpit. The lieutenant made access to the cabin area from the burn hole. No one was found in the cabin. R4 and the lieutenant were ordered to stay with the airplane while R2 utilized their thermal imaging system to look through the impact zone for occupants. The captain proceeded in R5 in a simultaneous search for the occupants. The burn path trail on the runway was followed and no one was located during that search. The Battalion Commander notified him later that the pilots were at the Federal Express hangar and he stopped his search and returned to the airplane.

When ARFF arrived on scene, heavy smoke and flames were observed from the cockpit to the wing section and extended to just aft of the wing where most of the

flame was observed. The ARFF captain observed fuel leaking from the right wing. The airplane appeared to be intact with exception of the burn area. The roof hatch was open near the cabin and a burn hole, just aft of the wing was used to fight the cargo fire. ARFF did not disconnect, remove, or secure anything during their operations. They did not aid in the removal of the Cockpit Voice Recorder or Federal Data Recorder, and Federal Express was never present on scene.

Station Two (located 3.2 miles from the airport,) home to Engine Two (E2) and the Battalion Chief (810), was dispatched to the airport as is standard protocol for an Alert 3. All personnel at Station Two are ARFF certified firefighters and are each issued airport badges. Engine Five (E5) from Station Five (7 miles from the airport) was dispatched in addition to Truck Four (T4) and Engine Four (E4) from Station Four. The team from Station Four consisted of the HAZMAT team.

E2 proceeded to the staging location at gate 48 but was unable to enter the airport property as the gate was iced shut. E2 proceeded to the ARFF station, picked up R1, and proceeded from that point to the scene. E2 is the only city unit that can proceed on scene without the need of an escort. Units E2, E5, and the 810 learned en route that the wreckage was closer to the Federal Express hangar and while en route, rerouted them to the Federal Express gate.

When Unit 810 and E5 arrived at the Federal Express gate, the EMS units were in trail. The Federal Express employee who opened the gate informed them that the two pilots were at the hangar and the EMS units were directed to the hangar.

At this time the fire was contained with exception of deep-seated cargo fires. A piercing nozzle which dispensed water was used to poke three separate holes in the fuselage to continue to fight the interior fire. A separate fire continued to flare up on the right wing due to the fuel leaking from the wing. A separate truck monitored that fire and knocked it down as necessary.

Access was made into the airplane via the rear cargo bay door from the rear of the airplane and more water was applied until it was apparent that the fire was completely out. Periodically they would return with water application, back off, and then return with water application until the fire was out. The ARFF captain also physically stomped out the grass fire along the debris path. He continued along the approach path to ensure all of the smaller fires had been extinguished.

Unit 810 delivered the HAZMAT manifest information to R5 approximately 45 minutes after R5's arrival on scene. The ARFF captain did not physically see the HAZMAT manifest on the airplane but was aware that such a document existed and was available. The HAZMAT team was on scene and there was no apparent risk to the fire response crews. Their response to the scene would have changed very little knowing beforehand that there was HAZMAT on board the airplane. After notification, everyone was kept upwind unless they were equipped with a full Personal Protective Equipment (PPE) suit.

One hour into the event, the ARFF captain was informed by airport operations that the airport was "closed." According to the captain, any time the airport was "open," the airport never dropped below the Full Index requirements per Part 139. Mutual aid was not involved during this response.

An inspector with the FAA arrived and took "custody" of the scene and was granted access to the airplane and allowed to take photographs of the airplane. The ARFF units continued to standby in the case of a flare-up. According to the city dispatch, the command leaders and last units left the scene at 1308:39.

ARFF utilized an incident command structure during the entire event. Upon initial arrival, the ARFF captain acted as incident commander until relieved by the arrival of battalion chief. The ARFF captain then took the positions of operations commander. With the arrival of Battalion Captain, the Battalion Chief became operations commander and the ARFF captain became the site commander. The mobile command unit was brought out to the accident site and ultimately used as a command center.

Richard Edwards
Equipment Operator – Rescue Two
January 30, 2009

Mr. Edwards was an equipment operator with the ARFF station for three years and had a total of 17 years experience as an equipment operator. He had been ARFF certified for nine years.

Mr. Edwards was sleeping when he heard the speaker "pop," and it sounded as if there was a "hung" microphone. He got up and started getting dressed when the alert tones sounded over the speakers again and an Alert 3 was announced for Runway 17 Right. He boarded R2 as the driver, the doors opened, and he contacted the ATCT for clearance. The response team was cleared to "proceed." While en route, ATCT was asked what type of airplane and how many were on board. ATCT responded that the airplane was an ATR and it was unknown how many were on board.

The runways and taxiways appeared icy so the trucks proceeded no faster than 45 miles per hour down Taxiway Juliet. They took Taxiway Mike to the north and still were unable to see the airplane due to the fog. As they approached the Taxiway Sierra intersection, they were able to see the airplane and changed course directly for the airplane. As they approached the wreckage, they started applying water and foam as soon as they were in range of the wreckage.

The wind was from the north and Mr. Edwards positioned his equipment to come in from the north, looking down the tail while applying agent. The flames and fire were knocked down in approximately 45 seconds and they were able to see that it

was a Federal Express airplane and he knew to anticipate two to three individuals on board the airplane. The lieutenant and hoseman got out of the vehicle and R4 approached the airplane from the nose and started applying foam. He heard the call from R5 to start looking for survivors. At that point in time he started using his heat sensing equipment along the median part of the airport looking for any survivors.

During the search for survivors he heard on the radio that two pilots were at the Federal Express hangar. He repositioned the vehicle to the north side and continued applying water and AFFF to the fire. Eventually the unit ran out of water. R1 arrived on scene and relieved R2 so that it could be reloaded with water and foam. The fire continued to flare up on the wing due to a fuel leak.

While controlling the fire, another call was received from ATCT concerning a pilot out on the ramp looking for ARFF. A second search was initiated but it was later determined that both pilots were accounted for.

He remained on scene until 0830 and continued to work the hot spots and the various flare-ups. The cargo area was flooded in efforts to douse the deep-seated cargo fire.

Howard Spence
Lieutenant – Rescue Two
January 20, 2009

Lieutenant Spence had been a Lieutenant with the ARFF Station in Lubbock, Texas, for five years. Prior to that, he was an equipment operator for seven or eight years. He had held ARFF certification since 1994.

Lieutenant Spence was sleeping in his quarters when the alert came in and he "heard voices" over the intercom. It was difficult to discern what they were saying and sounded like a microphone was stuck on. As he was turning on his light and getting dressed, the tone sounded again and an Alert 3 was announced. He went to Rescue Two (R2) and responded with his two colleagues, the driver, and a hoseman.

Earlier that evening Lieutenant Spence had seen a de-ice truck driving and suspected that the runways and taxiways would be icy. Their response was cautious due to the icy and slick driving surfaces. While en route, the driver asked about the type of airplane and souls on board. The tower controller responded that it was an “ATR 42” airplane and they did not know how many people were on board. The controller elaborated that the airplane was "fine" and shortly thereafter a ball of flames and fire erupted from the vicinity where the airplane impacted the ground.

He characterized the weather as "bad." The driving surfaces were slick, and the visibility was limited. It was unclear at times due to the darkness and fog to discern between smoke and fog. As soon as they confirmed the location of the airplane and fire, they "took off cross country" to the scene. As the driver pulled up to the airplane (left wing) he simultaneously applied agent. The midsection of the airplane was fully engulfed when they arrived and a section of the airplane had already burned through. R4 was directly behind them and positioned at the nose of the airplane. The fire was knocked down quickly and it was established that it was a cargo airplane and not a passenger airplane. He got out of the fire truck and approached the airplane, returned for his air pack, and had the hose man obtain a ladder to help find the pilots. He instructed the hoseman to climb up and look through the hatch for the pilots and he climbed in through the left side of the airplane to look from another vantage point. The pilots were not inside.

An immediate search for the pilots was initiated both on ground and in R5. During the search, the call came in from Command One (810) that the pilots were at the Federal Express hangar and focus and emphasis went back to the fire.

Shortly thereafter, the tower called to report that a pilot was walking around so a second search was initiated. It was later announced by the Battalion Chief that both pilot’s were en route to an area hospital.

Concern shifted once again to the fire that continued to flare up on the left wing due to the leaking fuel. After repositioning, R4 was successful in knocking down the fire on the wing.

Personnel from E2 and E5 took a line and applied water directly into the hole in the fuselage. The Lieutenant and hoseman from E5 used a hand-held penetrating nozzle to work at the deep-seated cargo fire. The cargo door on the left side was opened and firefighting efforts were continued from this access location.

An FAA inspector was the first individual on scene from a federal agency and asked about the flight recorders. A call was made and the National Transportation Safety Board (NTSB) stated that the scene should be treated like a crime scene and the recorders left in position until the NTSB could arrive and remove them.

R2 returned to the ARFF station once to reload with a water and foam.

Scott Nesbitt
Firefighter – Rescue Two
January 30, 2009

Mr. Nesbitt had been a fire fighter with the ARFF station since 2000. He had been a fire fighter for a total of 16 years.

He was sleeping when he heard voices in the background over the speaker system and what he thought sounded like an airplane transponder alarm over the radio. He started getting dressed when he heard the alert tones over the speaker system followed by an Alert 3 on Runway 17 Right. No further information was given.

ARFF standard procedures required that they dispatch immediately instead of taking time to respond to the tower radio notification. They departed the station within a minute and they asked the tower what kind of airplane had crashed and how many passengers were on board. ATCT responded that the airplane was an "ATR 42" and it was unknown how many were on board.

There were no specific directions or runway information given to respond to this accident and so they continued down on Taxiway Mike. Just after crossing the intersection of Taxiway Sierra they were able to see the smoke and flames from the airplane. Upon arrival the vehicle circled to the northwest to get a better angle on the fire and he exited the vehicle to aid in the search and rescue of the flight crew and possible passengers. When he realized that the airplane was a cargo airplane, he knew that they would be looking for two or three individuals. He conducted a ground search for the pilots and attempted to look through the cockpit windscreens utilizing a flashlight.

He obtained the ladder off of R4 and leaned it on the north side of the cockpit. He was not able to see either pilot and elected not to crawl thought the hole in attempt to find either of the pilots. Someone announced that the cockpit was clear. The fuselage fire flared up again and R4 knocked the fire down. During the search for the pilots he heard that both pilots were at the Federal Express hangar and would be cared for by the emergency medical technicians.

Shortly, the structural equipment arrived on scene with the Battalion Commander. ARFF personnel pulled hoses off of the structural truck to keep the ARFF trucks mobile. E5 utilized a penetrating nozzle and used it several times in the aft portion of the fuselage to fight the fire. They tried to move the cargo as little as possible while still keeping the fire down.

Mark Culbert
Equipment Operator – Rescue Four
January 20, 2009

Mr. Culbert had been an equipment operator with the ARFF station since October of 2008. Prior to that he was a "hose man" starting in May of 2008 and had been with the department since September of 2001.

Mr. Culbert was sleeping in his quarters when he heard people speaking over the intercom. Their statements were indiscernible but he got up and got dressed. A second alarm tone sounded and an Alert 3 was announced. He boarded R4 as the driver and followed behind R2. R2 requested further information about the

accident and they were told that the airplane was an “ATR 42” and that it was unknown how many persons were on board the airplane.

They traveled down Taxiway Juliet to Taxiway Mike. They turned onto Taxiway Mike, traveled northbound and eventually they were able to see the glow and the wreckage of the airplane, at which point in time they proceeded directly to the airplane. The skid marks or debris path leading up to the airplane was still on fire and it was still not apparent if it was a passenger airplane or a cargo airplane.

R4 responded to the nose side of the airplane. Operator Culbert applied water to the fuselage and eventually he prepositioned R4 in order to have better access to the wreckage and fire. At this point he also observed three of his colleagues looking for the pilots. ARFF relayed that the pilots were at the Federal Express hangar and would be taken care of at that location.

The fire continually flared up on the left aft portion of the airplane near the empennage. He repositioned to knock the fire down and then returned to the station to refill the truck with water and foam and then returned to the accident scene.

Bill Glass
Battalion Chief – Unit 810
January 30, 2009

Chief Glass was the Battalion Chief of "B" shift (designation 810) and had held this position since June of 2008. Prior to that position he was the Command assistant for the 810. He did not hold an ARFF certification.

Chief Glass did not remember the exact time, but an alert was "toned out" to dispatch Units 810, E2, E5, and emergency medical services (EMS) for standby to the airport. This alert was announced through the speakers in the station. As his unit (810) prepared to exit the firehouse the call escalated from a standby to an Alert 3. A standby launch meant respond to Gate 48 with lights and sirens and wait. An Alert 3 confirmed that a crashed airplane was on the ground and was on fire and to respond directly to the response Gate 48 to be escorted to the scene.

During the response, caution was exercised due to icy and slick roads. A speed of 35 to 40 miles per hour was used and it took ten to 12 minutes to respond to the airport. During the response he contacted the ARFF units for a better understanding of the situation. Unit E2 was equipped with ARFF radios and city radios and he heard that an "ATR" airplane was down but it was unclear if it was a passenger airplane or a cargo airplane. It was mentioned that it was a "turbo prop" or "medium sized airplane." Due to the time of night, he assumed that it was a cargo airplane. ARFF R5 communicated shortly thereafter that it was a Federal Express airplane and Unit 810 rerouted all response units, with the exception of E2, to the Federal Express Gate on the other side of the airport. Unit

E2 responded to gate 48, encountered issues with the gate being iced up, and proceeded to the ARFF station to pickup the reserve vehicle R1.

A Federal Express employee opened the gates upon their arrival and informed them that the two pilots were at the Federal Express hangar. The EMS units were directed to the Federal Express hangar to start administering first aid. R5 was notified that the pilots had been located.

Upon arrival it was difficult to establish if the runways were shut down or if the airport was closed; however, he was fairly certain that they were. There was no escort waiting for them when they arrived at the gate. They proceeded cautiously to the crash site and Chief Glass assumed incident command. Units E2 and R1 arrived on scene from the ARFF station and Units E4, and T4[15] arrived on scene through the Federal Express access gate. Unit 820, another Battalion Commander, arrived 15 minutes later and assumed command of the operations.

Once on scene it was clear that the main body of the fire had been knocked down and the cargo inside was smoldering. One ARFF unit had utilized all of their water and was cleared to return to their station to refill. Periodically, the fire would flare up due to fuel leaking from the wing and they would "knock" the fire back down. Ground lines were advanced off of one of the engines and used to address the aft cargo area where other flare ups and smoldering continued. Manually operated piercing nozzles were used on the right rear side of the cargo bay area. The cargo door was opened and water was poured on the fire.

Within 15 minutes of their arrival on scene, two Lubbock police officers brought them a partial HAZMAT manifest. T4 responded to the Federal Express hangar to obtain the MSDS sheets on those materials.

At one point they received a phone call from the air traffic control tower that a pilot was wandering out on the runway or tarmac, was lost, and not being assisted by EMS. Unit 820 was sent to look for this pilot and it was again confirmed that the pilots were accounted for and being transported to a local hospital.

As the morning progressed they continued to pour water on the fire as it would flare up.

Steve Couch
Battalion Captain – Unit 820
January 30, 2009

Captain Couch had been the Battalion Captain for eight moths. Prior to that position he served as a Lieutenant on a fire engine with the city. He did not hold ARFF certification.

[15] Engine Four and Truck Four were manned by the Hazardous Materials (HAZMAT crews)

Around 0430 he received a call from the dispatch center for Command One (810) to go to standby for an emergency at the airport. As they were departing the station, an Alert 3 was announced which indicated that an airplane was down on the ground and on fire. While en route, they communicated with the ARFF team and attempted to clarify what type of airplane was down and where the airplane was. It was established that it was an “ATR 42” and the airplane was on the north end of the field near Runway 17 Right.

The roads en route to the airport were a "bit" icy and 45 miles per hour was their fastest speed for responding to the airport. E2 was sent for back up. Normal response to the airport involved staging at gate 48. Due to the position of the airplane it was discussed to reroute the response to the Federal Express gate for faster access to the airplane. The captain relayed this reroute to the other responders including EMS.

E2 had already arrived at gate 48 and was unable to get the gate open due to the ice storm and the gate mechanism being frozen or covered in ice. E2 then responded to the ARFF station to pick-up Rescue One (R1) and continued the site from the ARFF station.

When unit 810 and other responding units arrived at the Federal Express gate a Federal Express employee was there to open the gate. This employee advised unit 810 that the pilots were both inside of the Federal Express Hangar. This information was passed on to the EMS responders and they responded directly to the hangar. Unit 810 drove to the crash site.

Upon their arrival it was apparent that the fire had been knocked down but occasionally a fire would flare up either inside the cargo area or along the wing. Five to ten minutes had passed after their arrival when Lubbock Police Department provided a copy of the HAZMAT. The Federal Express employees apparently provided this copy to the police department. No request was made by the fire department for this information. When they became aware of the HAZMAT, they ensured that their ground crews were suited with "full protection," especially when working downwind of the airplane and fire. He became aware that there was dry ice on board the airplane when water used to douse the deep-seated fire came in contact with the dry ice, and created "smoke" in greater quantities than would have come from the fire alone. Due to concerns about the integrity of the investigation, no attempt to enter the airplane was made and very little cargo was moved while trying to fight the fire.[16]

Medical Response

[16] It was later clarified with the LBB ARFF that they are permitted to move freight, cargo, and wreckage to contain and fight any fire they are faced with. They have jurisdiction over the accident scene until the fire is out and risk to others has been mitigated.

The Lubbock County Emergency Medical Services (EMS) were dispatched at 0439 and arrived on scene at 0456. Both the pilot and the first officer were evaluated at the Federal Express hangar at the airport and then transported to a local hospital for further evaluation According to the crew interviews conducted by the Operations Group, the captain sustained a broken orbital socket on the right side and the first officer sustained a strained back.

Injuries	Flight Crew	Flight Attendants	Passengers	Other	Total
Fatal	0	0	0	0	0
Serious	1	0	0	0	1
Minor	1	0	0	0	1
None	0	0	0	0	0
Total	2	0	0	0	2

Table 3. Injuries Table

Flight Crew Interviews

According to the Operations Group Chairman's Factual Report the first officer stated that she opened the cockpit escape hatch and observed the fire near the right engine which would "hinder" their escape route. The crew egressed through the forward cargo door. The crew did not report any anomalies with either the escape hatch or the forward cargo door.

Law Enforcement Response

According to the LBB Police Department Incident Report, the officer on duty was notified of the accident at 0437 with the activation of the "crashline." He dispatched an officer to gate 48. It was reported to him that the gate would not open due to ice so he dispatched the officer to gate 23, near the Federal Express Hangar.

HAZMAT

Declared packages of hazardous materials were onboard the accident flight. According to Federal Express, these items were loaded in zone three and zone six of the accident airplane. According to the dangerous goods manifest, five containers of liquid chloride, one container of liquid oxine, and one container of solid sodium iodine, were loaded in zone six. These items were considered radioactive materials and were labeled accordingly. These items were recovered from zone six. The containers were not damaged and had not been compromised.

According to the dangerous goods manifest, 25 pounds of dry ice was loaded in zone three of the accident airplane. According to Federal Express, fire destroyed the dry ice. In addition, one package of seat-belt pretensioners was loaded in zone

three. Finally two containers of consumer commodity (ORM-D regulated material) were located in zone three. According to Federal Express, these were destroyed.

E. ATTACHMENTS

Attachment 1: ARFF Dispatch Logs
Attachment 2: Airfield Conditions Report Log
Attachment 3: Airport Snow and Ice Event Log
Attachment 4: Airport NOTAMS
Attachment 5: Airport Emergency Plan
Attachment 6: Airport Snow and Ice Operations Plan
Attachment 7: Hazardous Materials Information (NOTAC)

Jennifer Rodi
Air Safety Investigator
National Transportation Safety Board