National Transportation Safety Board
Office of Pipeline and Hazardous Materials
Washington, D.C. 20594

October 31, 1997

HAZARDOUS MATERIALS GROUP FACTUAL REPORT

A. Accident Identification

Operator:	Federal Express Corporation
Aircraft:	MD-11, N611FE, Flight14
Location:	Newark International Airport, Newark, NJ
Date:	July 31, 1997, ~~1:25~~ am Eastern Daylight Time
NTSB No.:	DCA97MA055 ^0131

B. Hazardous Materials Group Members/Participants

Tom Lasseigne	NTSB-Accident Investigator Office of Pipeline and Hazardous Materials Safety Washington, DC
Gary Van Etten	NTSB-Accident Investigator Los Angeles Field Office 1515 W. 190th St., Suite 555 Gardena, CA 90248
Joe Ballas	Federal Aviation Administration FAA-Civil Aviation Security Hemisphere Center, Room 208 Route 1 & 9 South Newark, NJ 07108
Harry Yamka	Port Authority of NY and NJ-Fire Marshal Newark International Airport Newark, NJ 07114
James Langenback/ Deputy Chief Robert Smith	Newark Arson Squad-Chief of Detectives 1010 18th Ave. Newark, NJ 07106

David Littlejohn	Federal Express Corp.-Technical Advisor 2900 Business Park Memphis, TN 38194-2901
Chester Weekes	Port Authority of NJ and NY-Police Lieutenant Newark International Airport Administration Building Newark, NJ 07114
George Cook	Port Authority of NJ and NY Environmental Protection Unit Newark International Airport Airport Street-Building #80 Newark, NJ 07114

C. Summary

On July 31, 1997 around 0131 am EDT[1], a Federal Express Corporation (FedEx) MD-11 cargo aircraft, N611FE, operating as regularly scheduled cargo FedEx Flight 14 from Anchorage, International Airport to Newark International Airport (NIA), Newark, Essex County, New Jersey crashed, overturned and came to rest beside Runway 22R. The two member flight crew and three jumpseat passengers immediately evacuated the aircraft as fire units were positioned around the aircraft. Smoke was immediately visible as flames vented through the lower half of the overturned fuselage aft of the trailing edge of the wing. Firefighters extinguished the fire by 7:00 am with hot spots inside the wreckage debris occasionally flaring up during the next several hours.

The aircraft was destroyed. The captain received minor lacerations while evacuating the aircraft. All crew members and the three jumpseat passengers were treated and released from a local hospital.

D. Details of the Investigation

1.0 Background/Scope

Safety Board investigators and group members representing FedEx, the FAA and the Port Authority (PA) of NY and NJ documented the declared hazard materials shipping documentation, condition of the unit load devices (ULD's) and packaging that contained the

[1] All times included herein are local, Eastern Daylight Time.

declared hazardous materials, and hazardous materials emergency information provided to the local responders.

2.0 Declared Hazardous Materials

Shipping Documentation.—The FedEx pilot notification form, which is required to meet 49 CFR 175.33, consists of two parts:

- ***Part A - Notification of Dangerous Goods Loading***, provides the hazardous materials classification and their ULD numbers. (**See Attachment # 6A**.), and

- ***Part B - Notification of Loading of Dangerous Goods***, identifies specific information for a specific hazardous material on board the aircraft. **(See Attachment 6B**.) Prior to departure, FedEx personnel attach copies of the Part B's to the Part A, which is retained in the cockpit of the aircraft.

Specific information about the hazardous material in a given package, such as the substance's proper shipping name, United Nations identification number and hazard class, packaging group, quantity, 24-hour emergency telephone number, etc. is found on the ***Notification of Loading of Dangerous Goods (Part B).*** The Part B, which is affixed to the package, also has the FedEx tracking number and remains on the package throughout the shipment. Copies of the Part B's are placed in the ***Dangerous Goods Separation Pouch*** for the appropriate ULD.

The ***Dangerous Goods Separation Pouch*** is an envelope with a multiple copy form on the front that identifies the various classes of hazardous materials in a specific ULD. All of the separation pouches for the ULD's with hazardous materials are consolidated in the ***Notification of Dangerous Goods Loading (Part A)*** envelope. The Part A is also an envelope with a multiple copy form on the front that identifies all of the hazardous materials ULD's by their position on the aircraft and the classes of hazardous materials in each of the assigned ULDs.

Additionally, a ***Load and Weight Plan*** is also carried by the flight crew and lists by position in the aircraft, the number and weight of each ULD. **(See Attachment #6C**.) The ***Load and Weight Plan*** has entries under the type of service, load, and remarks to identify the ULD's by their various hazardous material classifications (i.e. flammable liquid, corrosive material, etc.). The ***Load and Weight Plan*** does not identify the shipping name of the hazardous materials nor does it provide the quantity of hazardous material in each package.

The assembled Part A, separation pouches, and Part B's for all of the hazardous materials on board are carried in the cockpit and must be available to the flight crew. Copies of the Part A, separation pouches, and the Part B's are also retained at the originating station and departing FedEx hub.

Cargo Containers.-- The declared items of hazardous materials on the aircraft were loaded in two designated ULD's in positions 1L (ULD #PMC80219FX) and 2L (ULD #PMC4718FM). The 1L ULD carried 13 packages of hazardous materials: 10 packages of aerosols (**Flammable gas - Class 2.1**), and 3 packages of a flammable solid **(Class 4.1**), two of which were metal powders and one was a flammable solid. The 2L ULD carried three hazardous materials packages: 1 package of perfumery (**Flammable Liquid - Class 3**), 1 package of methyl methacrylate, monomer inhibited **(Flammable Liquid - Class 3**), and 1 package of gallium **(Corrosive - Class 8**).

The hazardous materials manifest or FedEx pilot notification forms (Part A and B) carried on board the aircraft was not retrieved by the flight crew before they made their emergency evacuation from the aircraft. A post-fire inspection, on July 31, 1997, of the flight deck failed to recover the entire manifest; only remnants of original Part A form (listing all of the ULD's by their position on the aircraft and the classes of hazardous materials in all of the ULD's) were recovered; these remnants of Part A were considered only partially recognizable.

3.0 Inspection of Cargo Containers

Declared Hazardous Materials Containers and Contents.—Safety Board investigators and group members representing FedEx, the FAA and the PA attempted to document the declared hazardous materials in the ULD's. Due to the extensive 5 ½-hour fire throughout the aircraft, investigators were unable to recover any identifiable packaging or shipment manifest from either container, 1L or 2L. (**See Attachment #13**.) Except where previously noted regarding the recovered remnants of the ***Notification of Dangerous Goods Loading, Part A form***, all contents of the 1L and 2L ULD's were assumed to have been consumed in the fire.

Based on observations of the Newark Fire Department, who reportedly observed "popping" sounds around 3:20 am inside the aircraft cabin, it was assumed that the fire was consuming the contents of 1L ULD, which contained 13 packages of aerosol cans.

Other Cargo.—An inspection was conducted of the contents of 230 40-gallon drums located onboard the aircraft at **Positions # 8 and 9**. Fire fighters reported that flames in this general area there were significantly intense throughout the 5 ½ hour fire, reaching an estimated 50-ft above the underside of the aircraft. Examination of the drums showed signs of fire exposure with some distortion, such as bulging of the containers. The contents of these drums were not considered by the shipper to be a transportation hazard and therefore were not required to be declared as a hazardous material.[2] Additionally, a shipment of "materials for ink", located

[2] Warner-Lambert Materials Safety Data Sheet, MSDS #P021D00 describes the contents as antidiabetic pharmaceuticals, trade name Troglitaone. (See Attachment #7.)

at 8L, consisting of 19 pieces also was not considered by the shipper to be a transportation hazard and therefore was not declared as a hazardous material.[3]

4.0 Hazardous Materials Information Provided to Emergency Responders

The Port Authority aircraft rescue and fire fighting (ARFF) department was the primary fire department responding to the incident. Through mutual aid assistance agreements with the cities of Newark and Elizabeth, these municipal fire departments also responded and provided assistance. Among the agencies that responded to the accident were the New Jersey Department of Environmental Protection, New Jersey State Police Office of Emergency Management, Newark Emergency Medical Services, FAA, and FedEx Security.

Local Response and Fire Behavior.-- The air traffic control tower at Newark notified the Port Authority (PA) police fire department around 1:25 am about a " Condition 1 alarm, with aircraft involvement on Runway 22R." While en route to Runway 22R, the ARFF crew chief reported flames visible along Runway 22R and that flames were venting from the aft section of the fuselage. The ARFF response units were on scene within 35 seconds and were engaged with fire suppression operations immediately following their arrival on scene. During the 5 and ½ hour fire fighting efforts, the fire reportedly propagated from the aft section to the front of the aircraft.

While he was en route, the Incident Commander contacted the PA police desk and requested activation of the mutual aid contingency plans with Newark. Around 1:38 am, the Newark Fire Department dispatcher was contact by the PA and fire units were dispatched.

On his arrival, the incident commander's vehicle was the command post and he was advised that all aircraft crew members and jumpseat passengers had evacuated. Within the first 5-minutes of his arrival, the Incident Commander requested the aircraft's shipping documents to determine if there were declared hazardous materials on the aircraft. This request was relayed to the FedEx station at Newark by the airport police desk. After waiting for approximately 20-minutes, the Incident Commander dispatched a police sergeant to the FedEx facility to retrieve the shipping documentation.

Retrieval of the Shipping Documentation.--Immediately following the crash, the FedEx On-Duty Manager for international flights at Newark notified the FedEx Global Operations Command Center (GOCC) in Memphis, Tennessee in order to coordinate the retrieval of the flight file information. In order to obtain the declared hazardous materials documentation, the Newark FedEx Duty Manager contacted the FedEx Duty Officer at the Anchorage office, the FedEx departure station for Flight 14. Because this shipment originated in Narita, Japan, copies

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[3] Materials Safety Data Sheets provided by manufacturer, Orient Chemical Industries Co. Ltd, et. al. identifies the material as black azo dyestuff with organic solvents- naphalene derivate, triethylene glycol monobutyl ether. (See Attachments 8,9,10 and 11.)

of the shipping documentation were only retained at the FedEx station in Japan and were not available at the FedEx Anchorage office.

Based upon preliminary information relayed from Narita to Anchorage, Fed Ex Newark personnel initially prepared a brief note listing some of the hazardous materials information onboard FedEx Flight 14. Between 3:00 am and 3:20 am, this note containing the following information was given to the Incident Commander at the accident site:

"9 pounds of UN 1325
238 pounds of UN1950
78 pounds of UN 3089
38 pounds of UN 1325 (another entry)
44 pounds of UN 1266
maybe 36 pounds of an unknown haz. mat.

From Gonsalves, John", [Senior Manager International Operations, FedEx, Newark.]

Shortly after receiving this information, the Incident Commander requested the PA police desk to contact Chemtrec to get a description of the materials using the UN numbers, so they could know how to combat the hazardous materials.

Chemtrec responded that some of the material might pose a contamination threat to the air and that one of the products may react violently with water.[4] The Incident Commander later could not recall which product would react with water. The fire attack operations continued and the firefighters were advised to stay up-wind and wear protective (i.e. self-contained breathing apparatus) gear.

Outside Responders.--Shortly before 1:38 am, the Incident Commander contacted the PA Police desk and requested mutual aid under the NIA Airport Contingency Plan. At 1:38 am, the Newark Fire Department (NFD) was notified and responded initially with an engine company and a deputy chief. Following their arrival at the NIA airport access gate around 1:42 am, a PA escort was dispatched and escorted the responding Newark Fire Department units directly to Runway 22L.

By 1:46 am, the Newark Fire company arrived at the site on Runway 22L and was advised by the ARFF Crew Chief that hazardous materials were on board. At 1:59 am the NFD Deputy Chief notified the NFD dispatcher and the Newark Hazardous Materials Response Unit was dispatched. Shortly after their arrival on scene around 2:02 am, crew began working with the PA to gather an accurate list of cargo on the aircraft.

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[4] In follow-up to an earlier call to CHEMTREC, the PA Police requested North American Emergency Response Guide information on flammable solid/aerosols/metal perfumery products with flammable solvents in them. CHEMTREC advised from the North American Emergency Response Guidebook not to use water and avoid being down wind of the fire.

New Jersey Department of Environmental Protection (DEP), the state agency with the responsibility to monitor releases of environmentally harmful substances, assess any environmental damage, and to oversee cleanup and restoration of the affected areas was notified around 2:00 am by the Newark Fire Department. DEP personnel arrived on scene and established downwind wind monitoring operations shortly after 3:00 am. Shortly after their arrival around 3:15 am, the DEP team advised the Incident Commander that they did not detect elevated toxic chemicals being released and they would continue to monitor the air quality at the site.

Around 3:20 am, the NFD Deputy Chief observed "popping" sounds in the fire as it advanced towards the forward bulkhead of the cabin. [Later it was surmised that the aerosol shipment, which were placed in a forward ULD, were fully engulfed in the cabin fire at this time.]

Around 4:30 am, as the entire site was being blanketed with foam, Newark Fire Department fire fighters reportedly experienced nausea and tightness in their chests. At all times, these fire fighters reportedly were up-wind and wearing self-contained breathing equipment and not exposed to the jet fuel and foam. Twelve fire fighters were treated and released at a local hospital; one fire fighter remained in the hospital overnight.

Around 6:00 am, as the fire was extinguished except for occasional hot spots inside the aircraft, the NFD Deputy Chief discovered a package marked: "Biomedical Research." The Deputy Chief immediately the firefighting operations stopped until an accurate cargo manifest could be obtained. Later it was determined that this dry-ice refrigerated perishable shipment contained sterilized blood and was not a dangerous goods shipment, such as an bloodborne pathogen or infectious substance.

Prior to this time, between 5:00 am and 6:00 am, Anchorage had sent faxes of all declared hazardous materials manifests (Part A and Bs) to Newark FedEx. These faxes were immediately provided to the Incident Commander at the command post shortly after 6:00 am.

By 7:00 am the Incident Commander began securing the Port Authority ARFF vehicles, and the Newark Fire Department assumed control of the incident and wreckage overhaul.

D. Additional Information

From September 12 thru 22, 1997 at least 12 dangerous goods air carrier were surveyed as to their procedures for providing hazardous materials shipping information to emergency responders in an aviation accident. These selected carriers supplied examples of their hazardous materials documentation along with their procedures for generating information about the identity and quantity of hazardous materials onboard in the event the shipping documents on the aircraft were lost. The findings of the survey are contained in **Attachment #12**.

Following this accident, an environmental impact assessment was contracted by FedEx through The Tyree Organization, Ltd. to evaluate the potential impact from the release of Jet Fuel A and/or hydraulic oil at the incident scene. This assessment was required under the New Jersey Department of Environmental Protection's "Technical Requirements for Site Remediation" (NJAC 7:26E). **(See Attachment # 14.)**

Following the accident, FedEx was advised by the FAA-New York Civil Aviation Security Field Office in regards to FedEx Airbill # 400-9001-9016 that the: "Proper shipping name was misspelled, 'Methyl Metharylate Monomer, Inhibited' was listed as 'Methyl Metacrylate Monomer, Inhibited'. FedEx had accepted a dangerous good shipment with the proper shipping name misspelled in violation of ICAO, 4;4.1.2." **(See Attachments #15.)**

On October 24, 1997, a draft of the Hazardous Materials Group Chairman's Factual Report was mailed to all group members for review. Written comments were received from FedEx, FAA-CASFO Newark and PANYNJ. PANYNJ-Police and the Newark Fire Department did not participate.

Tom Lasseigne

National Transportation Safety Board
Office of Pipeline and Hazardous Materials Safety
490 L'Enfant Plaza East, S.W.
Washington, D.C. 20594

SUBJECT: Review of the Hazardous Materials Group Chairman's **Draft** Factual Report [In reference to FedEx Flight 14 Crash and Fire at Newark International Airport on July 31, 1997. (DCA-97-MA-055)]

I have reviewed the referenced report and:

----------(A) I have no comments to make, or

---X---(B) my comments are submitted herewith.
MADE TO TOM LASSEIGNE VIA TELEPHONE. I RESERVE THE RIGHT TO REVIEW THE FINAL REPORT.
(Please submit this statement and your comments within four (4) working days.)

[redacted]
Participant's Signature

FEDEX
Organizational Affiliation

10-30-97
Date

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---JB---(B) my comments are submitted herewith.

(Please submit this statement and your comments within four (4) working days.)

[redacted]
Participant's Signature

FAA
Organizational Affiliation

10/30/97
Date

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(Please submit this statement and your comments within four (4) working days.)

[redacted]
HARRY YAMKA
Participant Signature
Fire Marshal
Newark International Airport
Organizational Affiliation

OCTOBER 29, 1997
Date

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[redacted]
Participant's Signature

PANYNJ
Organizational Affiliation

10/30/97
Date

E. List of Attachments

#1 Record Of Conversation with Newark Aircraft Rescue and Firefighting Personnel. 8/1/97.

#2 Record of Conversation with Newark Fire Department Personnel, 8/8/97.

#3 Record of Conversation with FedEx Personnel, 8/2/97.

#4 Preliminary List of Declared Hazardous Materials prepared by FedEx Newark Duty Officer on 7/31/97 around 3:00 am.

#5 Faxes sent to the Newark FedEx On-Duty Manager by the Anchorage Station Manager.

#6A FedEx Notification of Dangerous Goods Loading Part A (Narita, Japan).

#6B Fed Ex Notification of Loading of Dangerous Goods Part B's (Narita, Japan)

1. Fed Ex Airbill Number 023-8016 3521
2. Fed Ex Airbill Number 023-8228 4473
3. Fed Ex Airbill Number 400-9001 9016
4. Fed Ex Airbill Number 023-8226 7805
5. Fed Ex Airbill Number 023-8656 0891
6. Fed Ex Airbill Number 400-9566 7202

#6C Flight 14 Load and Weight Plan

#7 Warner - Lambert Materials Safety Data Sheet- MSDS P021D00

#8 Orient Chemical Industries Co. Ltd. Materials Safety Data Sheet - MSDS BJBK817

#9 Zenaca Materials Safety Data Sheet - MJR-580

#10 Fluka Materials Safety Data Sheet - MSDS 90440

#11 Nissin Chemcial Ind. Co, Ltd. Materials Safety Data Sheet - MSDS "OLFINS"

#12 Dangerous Goods Air Carrier Survey, October 16, 1997

#13 Photographs # 12-1 thru 12-6.

#14 September 16, 1997 Letter from Gregory Carr, The Tyree Organization, Ltd.. to Aaron Werbin, FedEx.

#15 Letter from FAA-CAFO (NY) to P. Oppenheimer, FedEx.

Special Agent's Statement.