Attachment 1

to Operational / Human Factors Group Report

DCA07MA310

INTERVIEW SUMMARIES and CREW STATEMENTS

MEMORANDUM OF TELEPHONE INTERVIEW

CONVERSATION WITH: CAPTAIN STEVEN GARBE

SUBJECT: CHI07MA310

DATE: SEPTEMBER 29, 2007

TIME: 1400 CENTRAL STANDARD TIME

Steven Garbe stated that he has never had an in-flight emergency and never has had to initiate an evacuation from an airplane. He was hired by American Airlines on August 6, 1990, and was upgraded to captain on the MD-82 July 2001. After October 2003, he was assigned a first officer position on the Boeing 777 and on August 1, 2007, he retuned to the captain position on the MD-82. He has a total flight time of about 850 hours on the MD-82. He had never had any start valve problem other MD-82's that he has flown and he could not remember if he had a start valve problem when he had previously flown N454AA.

He was assigned to fly flight 1400 yesterday morning from reserve and scheduled to dead head on flight 761 to St. Louis in order to fly flight 1400. Captain Martin, the flight 761 captain, was deadheading back to Chicago on flight 1400. When Mr. Darbe arrived at N454AA, he reviewed the minimum equipment list and noted an open item for start valve, which he discussed with the previous captain. Captain Martin said they had two previous start valve problems. When the flight 1400 crew started the left engine in St. Louis, there was no indication of the start valve opening and no rotation of the engine on their first start attempt. Mr. Darbe talked to the ground crew and mechanic. Mr. Garbe discussed with first officer the quick reference handbook manual engine start procedure. Upon reaching 35 percent they released the switch and the start valve was closed manually and the start valve light was no longer illuminated. The engine was operating normally and all cockpit indications were normal. After they were pushed back, they started the engines and then taxied to depart on runway 30L. The landing gear was retracted at the "normal" point and about 1,000-1,500 feet above ground level, they first saw the left engine start valve light illuminate followed by an engine fire warning light. The time between the start valve open light to the fire warning light illumination was about 5-10 seconds "at the most." There were no start valve indications after start to the time the start valve light illuminated after takeoff.

He said that he declared an emergency with air traffic control and were returning. He stated that they followed the engine fire damage separation checklist and shut the fuel control lever off and pulled the fire handle and discharged the fire bottles. He stated that the first officer had "difficulty" moving the fuel control lever to the off position and had "difficulty" pulling the fire handle all the way out. He got the discharge indication from both bottles. He then had the first officer fly the airplane and called the flight attendant to tell her that they were landing in about 5 minutes and was going to make the decision whether to evacuate one they were on the ground.

They had several strange cockpit indications. When the left engine wound down, they lost left generator and left bus. Mr. Darbe lost his PFD and NAV display. The digital flight guidance panel light extinguished and he thought the right generator should have picked up the bus. He flew the airplane manually because he wanted to be coordinate the flight and engine controls manually. He felt there was not enough time to get everything done and asked the number one flight attendant to summon captain Martin to the cockpit where he could make public address announcements and serve as an "extra set of eyes."

He selected the auxiliary power unit switch to start on downwind. The APU did not take over the left bus until the first officer reset the APU generator. They made a turn onto final and about 2,000 feet they intercepted the PAPI, he called for the landing gear to be extended and did not receive gear indications. When they lowered the landing gear it felt like the main landing gear extended and they did not get a center console nose gear down indication. The first officer tried to call the tower about 4 times to get a response from the controller but the controller was busy with other traffic around the airport. The ATC controller replied saying that only the main landing gear was extended but not the nose. He thought it was more of a hazard being low to the ground to attempt a manual gear extension rather than execute a go-around and try to return with more controlled "situation." They executed a go-around with leaving the landing gear extended and retracted the flaps to 11 degrees. He thought that he had adequate climb performance with the landing gear extended. He didn't have a problem controlling the airplane until he was passed the departure end of the runway after the flaps were selected to 11 degree. He had difficulty keeping the left wing up so he increased the throttle on the right engine. While turning downwind, the first officer followed the emergency gear descent checklist and raised the emergency gear extension handle. The nose gear then extended and locked down. They got a nose gear indication and called ATC to ask if all of the landing gear was extended to which the controller replied that it was. He flew a "normal" pattern and flew the airplane with "extra speed" because he felt that he had better aircraft control. The touch down was a "normal" touchdown "pretty close" to the middle of the runway. He said that the airplane had directional control problems when the nose touched down so he put the right engine into idle reverse. He had to apply full left rudder and come out of idle reverse to return the airplane from the left side of the runway to the center. During the landing rollout, it felt like the nose wheel steering was not functioning but he didn't use it until the end of the landing rollout relying on the rudder. It seemed like there were a lot of unusual things going on in the cockpit. There were no hydraulic warnings that he noted, but they did have multiple annunciation lights illuminated.

The Airport Rescue and Fire Fighting (ARFF) trucks followed them down the runway and one truck parked next to the 1 Left door. He said that he was "surprised" that ARFF did not talk to him on the ground control frequency. One of the ARFF personnel came up to the window and did not plug into the interphone. He opened the window. The ARFF personnel told him that they were extinguishing a "residual" fire from fabric hanging from under the left engine/cowling. He told Captain Martin to tell the passengers to remain seated since there was foam on the runway, the presence of vehicles, and the fire. It was the "best" place for the passengers. There was no smoke in

the cabin or cockpit. He felt that the workload was as "busy as he could handle at the time" and his main focus was the airplane altitude airspeed and heading. He was not getting directly involved in "doing the steps." He was making the final decisions of how he was going to landing. It was helpful to have the third pilot in the cockpit, which he learned from his experience on long-haul flights.

He thinks that the start valve light is connected to the master caution light but is not positive. When the airplane stopped on the runway, the air stairs were pulled up and it didn't "seem like a very long time" when someone boarded the airplane. The ARFF personnel asked if he had smoke aboard and then wanted to come inside to see for themselves. Both fire bottles were pulled and the light in the handle remained illuminated even on the ground. He thinks that the checklist says to discharge the second fire bottle after 30 seconds but he had to refer to the checklist.

He said that it is a procedure to pull the CVR and FDR circuit breakers after this occurrence and cited the ground evacuation checklist. Mr. Garbe did not recall when they were pulled and when he met Phil Dixon at the bottom of the air stairs, Mr. Dixon asked if they had been pulled to which Mr. Garbe replied by saying he didn't think so and somebody went back in to pull them which he thinks was the first officer. He did not run the ground evacuation checklist.

Mitchell Gallo
Air Safety Investigator

MEMORANDUM OF TELEPHONE INTERVIEW

CONVERSATION WITH: F/O KEVIN MAY

SUBJECT: CHI07MA310

DATE: SEPTEMBER 29, 2007

TIME: 1500 CENTRAL STANDARD TIME

Kevin May stated that he served as an A-10 pilot in the United States Air Force for approximately 10 years and in 2001 he left the Air Force and began employment with American Airlines and initially flew the F100 for about 4 years, the 737 for a "couple" of years, and the MD80 for about 5 ½ - 6 years. He has flown the MD80 for approximately 3,000 hours. He had been involved in a "couple" of emergencies, which were in the military where he has had engine fires. He also had an emergency involving a Boeing 737 with "stuck" flaps while flying into Los Angeles.

N454AA arrived late from Chicago with a left engine start problem, which began several days ago and was addressed by maintenance by changing a start valve. The flight crew that had flown N454AA from Montreal had problems with the start valve. While in

Chicago, the flight crew did not obtain enough engine rpm to obtain a start of the left engine but were able to later start the engine on a second engine start attempt. The flight 1400 flight crew had the same problem in starting the left engine while in STL so they referenced the minimum equipment list and the quick reference handbook. Maintenance said they were going to swap out the start valve, which was a 15-minute process, after which they got the start valve open and then attempted a start. The left engine started "normally," and the start valve light extinguished. They pushed back "normally" and started the right engine as they were waiting to taxi. The taxi was "uneventful". The left engine start valve illuminated and "right after that" the left engine firelight illuminated while climbing through about 2,000-2,500 feet. Kevin May declared an emergency with the STL air traffic control (ATC) tower after which they made a right-hand turn for the downwind leg, leveled off, and obtained a block altitude of 2,000-3,000 feet. While on the downwind leg, he went through the engine fire and engine damage separation checklists. As they went through the checklist they tried to shut the fuel lever about a ¼ of the way down it bound up and needed a "great deal of effort" to shut of and had to use two hands to get it to the stop. It went all the way down but it didn't feel like it really shut off. He extended the fire handle about half way out and tried to fire the bottles but then had to pull the handle again. He had "difficulties" trying to actuate the fuel shutoff levers as well as the fire handles both of which were "binding." He said that the only other time he had to actuate a fire handle was in the simulator, which felt "very smooth" and work more "fluid." The airplane fire handle felt as if it was "welded" shut. He discharged one bottle followed by the other bottle about 20-30 seconds later because the engine firelight remained illuminated. The left engine start valve light would cycle for 5 seconds, the AC cross light illuminated and there were "so many things going on that didn't make sense." The fire loop lights were illuminated but he was not sure if the open firelight was illuminated. There were "a lot of sporadic" electrical abnormalities. They did not have any issues with the hydraulic system up until the fire handle actuation, which shut down the left hydraulic system. They had the deadhead captain, Phillip Martin, come up to the cockpit and at that point, Mr. May was flying the airplane while Steve Garbe "coordinated" with the flight attendants and Mr. Martin, who later briefed the passengers. Mr. May didn't remember if the engine was seized; but because of the yaw, he suspects that it was seized. It required about 7-8 units of rudder trim and more rudder than what was required in the simulator. He wasn't alarmed by the "way" the airplane was flying. Mr. Garbe took the controls while on downwind and then they started losing other electrical systems. The generator went off line just before or after the left engine shutdown, and the left AC bus did not transfer. His concern was to get the airplane on the ground since they were in visual meteorological conditions. The ATC tower cleared them for a visual 5-mile final approach for runway 30R. He extended the landing gear about 4 ½-5 miles out, and it didn't "seem normal," but they were not concerned because "nothing" was "normal." He went through the before landing checklist to ensure that the landing gear and flaps were extended. With the AC crosstie failure, they had no landing gear indication, and the nose gear plunger was still retracted. They did not receive landing gear not extended horn. Mr. May said that they contacted ATC three times before ATC responded, because the ATC controller was simultaneously working arrivals and departures. By the time ATC responded, they were no linger in a position to land and executed a go-around. They were about 1-1/2 miles from the runway and about 400 feet with flaps 28 degrees when they executed a go-around. They climbed to about 2,000 feet and executed a right turn for another base leg to runway 30L. He went through the

manual gear checklist for unsafe nose gear and was able to get the nose landing gear extended. The auxiliary power unit (APU) started, and he did not know that Mr. Garbe started the APU but later noticed that is was operating. When the APU began operating, the left AC bus became energized and they obtained a three green gear indication. They went out about 5 miles again, for an approach to runway 30L. Mr. Garbe was a "little fast" and a "little hotter" on his approach. He told Mr. Garbe to bring the throttle back "a little bit," which he did when they got closer to the runway. The firelight remained illuminated when the airplane came to a stop. ARFF did not use the interphone system and was supposed to contact them on the ground frequency and eventually Mr. Garbe opened the window in order to talk to them. Mr. May couldn't hear the conversation between them. He said that the ARFF personnel were on board and keeping everybody on board was the safest.

American Airlines emergency evacuation training stated that its captain's discretion to evacuate an airplane. If they have an airplane that is still on fire then that would be an evacuation consideration, but there was no fire and ARFF was outside the airplane. He said that "blowing" slides and sending 137 people onto the ramp into that "mess" was not appropriate." He said Mr. Garbe and Mr. Martin as well as himself were in agreement with that decision. He said that they had the best people [ARFF] outside the airplane to take care of any situation.

Approximately 30-40 minutes after the airplane came to a stop, he pulled the cockpit voice recorder (CVR) and flight data recorder (FDR) circuit breakers with a mechanic watching. The mechanic came up to and told them to pull the circuit breakers. Mr. May said that they did not perform the ground emergency evacuation checklist. He stated that the ground evacuation checklist is not the only time to pull the breakers.

Mitchell Gallo
Air Safety Investigator

MEMORANDUM OF TELEPHONE INTERVIEW

CONVERSATION WITH: PHILLIP MARTIN

SUBJECT:CHI07MA310

DATE:

TIME:

Philip Martin stated that he was seated in 9D, and about 5 minutes after takeoff, he noticed the airplane did not depart the airport traffic pattern as expected. The cockpit door opened and he saw the firelight and heard an audible left engine fire warning. Shortly thereafter, he was called into the cockpit. He entered into the cockpit after the first landing attempt, which was rejected because the nose landing gear was not extended. There was no electrical so all the landing gear indications were showing the landing gear in the up position. He could hear that something was down but the manual indication of the nose gear pin showed that the nose gear was still retracted. The setup on the switches was “normal” for take off with the transfer pump on and both engine hydraulic switches on high. There were “a lot of lights” on that shouldn’t have been on “normally” but there was an engine fire. The start valve open light was also illuminated. Steven Garbe asked him if the start valve light illuminated in-flight when he had flown the airplane to which Mr. Martin said, “no.”

Mr. Martin stated that he flew the airplane on four previous flights and the manual start procedure was used on each of those flights. During a manual start for a flight from Chicago to St. Louis, he only received about 15 percent N2, which was not enough for an engine start. During the first engine start, no fuel was initiated into the engine. They then closed the start valve, opened it a second time, and attempted another start with normal engine rpm and 400 degree EGT, which he described as normal.

During the manual start procedures, he was in communication with a mechanic who was standing by the nose of the airplane plugged into the forward interphone. The mechanic at the nose of the airplane provides signals to a mechanic at the engine. After the engine

start, the mechanic next to the engine closes the engine cowling/panel. The mechanic manually closes the valve by using a socket drive to through a receptacle to rotate the start valve while standing on a stand.

The airplane originated out of Dallas where the airplane had a start valve "failure." The start valve was replaced but it did not fix the problem. Subsequent manual starts were then performed in Chicago for a flight to San Antonio where Mr. Martin accepted the airplane and flew it to Chicago and Montreal. Montreal has contract maintenance and the mechanic that came out was not familiar with the manual start procedure because it took a long time for him to start the engine. Mr. Martin said that the mechanic would "push a switch." He said that the mechanic pushed the switch 3 or 4 times and the start valve open light illuminate for 1-2 seconds and then extinguish. The Montreal mechanic tried to override the start valve electrically but was unsuccessful so he then attempted to override it manually by moving the butterfly valve. Mr. Martin then flew the airplane to Chicago where he performed a manual start and flew it to St. Louis where Mr. Garbe accepted the airplane.

Mitchell Gallo

Air Safety Investigator

Interview: Captain Steve Earle Garbe
Date: November 2, 2007
Location: phone interview
Time: 1300 EDT

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association; Tom Walsh, FAA.

Captain Garbe was represented by Ray Duke.

During the interview, Captain stated the following information:

He was hired by American Airlines in August 1990. He had about 14,000 total flight hours including about 800 flight hours in the MD-80 airplane as pilot-in-command (PIC). He had not been flying the MD-80 airplane since prior to 9/11/01 and had only been back flying the airplane for about two months. His flight time since returning to the MD-80 was about 120 hours. He had no flight experience on the MD-80 as F/O.

He was based in the Chicago, Illinois base, but the trip sequence required him to deadhead into St. Louis, Missouri to start the trip. He went to bed about 2200 on night before the event and awoke the next morning at about 0700 when crew scheduling called him.

During the taxi out, the start valve open light was not on. He knew this because one of the last things they do on the before takeoff checklist was look at the annunciator panel. He said he looked up and checked the annunciator panel.

He was the flying pilot. The F/O was the first one to see the light. The first he recalled seeing the start valve open light was when they were somewhere between 1,500-2,000 feet. After they first noticed the start valve open light, it was a very short time before the engine fire indication light went on. His first response was they needed to get back to the airport immediately and he told F/O to start working the engine fire damage separation checklist. F/O May performed the checklist.

He pulled the engine throttle back to idle. He called that the engine indication light stayed on after he pulled the throttle back.

His memory of the event was they went straight through the initial steps of the checklist, but after hearing the CVR, he knew he talked to F/As in the middle of the checklist.

The F/O shut off the fuel lever and pulled the fire handle. He did not talk to the F/O about any difficulty in shutting off the fuel lever because he “had a handful of airplane”.

The engine fire light was still illuminated after the fire handle had been pulled.

He flew the airplane during the entire event except for the brief time when he was talking to the F/As. He contacted the #1 F/A and informed her that we had a fire on the left engine and we were returning to the airport to land. I said that I did not anticipate that we would have to do an emergency evacuation, but if we did have to do an evacuation, I would give her an “Easy Victor” signal three times over the PA. I told her to prepare the cabin and that she had about 5 minutes.

He did not ask the F/A if she had smoke or fire in the cabin but while everything was going on, the cockpit door had come open since they had lost the left AC bus. They had a pretty good idea of what was happening in the back. If there had been any smoke or fumes in the cabin, he knew the F/As would not have hesitated to tell him. He said he did

not think specifically about asking the tower if they saw fire on the airplane. They were in communication with tower and were already on a downwind.

When they were going through the engine fire checklist, He told the F/O that he would use 28 deg of flaps and knew the single engine land procedures and did not need to go over that checklist [single engine land checklist].

About the time they shutoff the fuel lever, he started getting some strange electrical problems he did not expect to see in that circumstance. His digital flight guidance panel went blank. His Primary and NAV displays went blank momentarily. There were so many lights on the annunciator panel that he felt the information on that panel was completely useless. He speculated that about 2/3rds of the annunciator lights on that panel were on.

They did not talk about resetting the AC cross tie – he did not pick out that the cross tie lockout light was on among all the other lights on the annunciator panel.

He was flying based on the standby indicator and also visually using the horizon.

After they extended the gear, F/O May pointed out to him that the nose gear extension pin was not extended. That was the first indication that he had that the nose gear was probably not down. He told the F/O to call the tower and ask them if they could confirm. When tower responded, they were about 300 feet above the runway and he felt that was too close in to do an emergency gear extension.

He had no thought about landing with the nose wheel up.

They had done what they could to fight fire. He could not even trust what the lights were telling him based on all the electrical anomalies. The fire being on a pod was contained and less of a problem. He did not want to attempt a nose up landing for a couple of reasons. If he did a nose gear up landing, he would most likely have some passengers hurt and he had no time to brief the F/As that they would do a gear up or partial gear up landing. The F/As would not have been ready for that. The airplane was flying and he felt it was safer to go around and extend the gear in a controlled situation.

The reason the gear was not pulled up on the go around was because he did not want to make the situation worse.

He thought he asked for flaps 11 during the go-around.

They circled around to land.

After the g- around, as they were turning crosswind to downwind, the tower volunteered that all they saw was soot on the engine. Tower did not say anything about any fire or flames or anything else.

He brought up Captain Martin to the jumpseat. When Captain Martin arrived, he was told his duties were to communicate with the F/As and make passenger announcements (PA) as necessary.

He never touched the fire handle.

After touchdown, he stopped as quickly as he could. ARFF was present when we stopped. He was talking to them within short order through the window. Communications with ARFF were adequate once we were talking through the window.

First thing ARFF told him was that there was a small residual fire under left engine and they were foaming it as he spoke and everything was secure. At that point, he decided the passengers were safer on the airplane and there was no reason to evacuate.

He was relying on Captain Martin to communicate with F/As. Captain Martin did not relay any concerns in the back and Captain Garbe was pretty sure at that point the cockpit door was open.

He recalled that ARFF yelled up through the window that something was dripping from the engine. That was about the time when F/O indicated that the fire handle had gone back in and he pulled it back out. He did not recall for sure if ARFF told him the drip had stopped but to the best of his knowledge they told him so. They told him 3 different times the airplane was safe.

He may have misspoke when he said they would taxi to the gate. He knew the tug was on the way and they were waiting on it.

There were three times that ARFF said the airplane was safe. Once immediately after landed and then later they confirmed it. The third time was after the concern about the fuel leaking.

He had never had an opportunity to command an actual evacuation. He had only done one in the simulator.

Greatest challenge in making an evacuation decision is determining what the safest course of action is in preventing injury to passengers. He said the training and guidance he received was adequate. He did not think there needed to be any changes to the training or guidance as a result of his event. He felt he did about the best he could under the circumstances and did not think he would do anything different.

ARFF gave him the sense that they had the situation under control by their actions and communications.

Digital flight guidance panel never came back, so he did not use the autopilot.

If it was night or dark, he could have restored instruments by selecting emergency power on

He could have delegated flying duties to F/O if he needed to.

Interview: First Officer Kevin May
Date: November 2, 2007
Location: phone interview
Time: 1215 EDT

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association; Tom Walsh, FAA. First Officer (F/O) May was represented by Ray Duke.

During the interview, F/O May stated the following information:

He was hired by American Airlines in January 1999. He had about 8,000 hours total flight time, including about 3,000 flight hours in the MD-80 airplane. F/O May said this was his first flight of the day. Captain had deadheaded down from Chicago, Illinois. On the night before the event, he went to bed about 2000. He awoke at about 0400 on the morning of the event. He commuted into St. Louis, Missouri. The scheduled departure time for the event flight was 1245.

The Engine Start Valve Open light was on the overhead annunciator panel. The light did not come on or even flicker during the taxi out or takeoff. The light came on after they had started climbing right turnout toward Chicago, Illinois. He was resetting their heading bug when he noticed the light. The light did not turn on the Master Caution light. The engine fire indication light came on about 30 seconds later. The captain was the flying pilot.

Initially, he was operating the radios and they were on a downwind position as the event began occurring. They declared an emergency to ATC. As he was the nonflying pilot, he ran the checklists.

He ran the Engine Fire and Damage checklist. When they pulled the throttle back to idle, the engine fire indication light did not go out. He then continued down the checklist. When he got to the fuel lever on the checklist, the fuel lever was difficult to shut off. He said it did not delay shutting the fuel lever off. The fire handle was difficult to pull out. After he had pulled the fire handle, the fire indication light was still on. He then fired both fire extinguisher bottles. The fire indication light still did not go out. At point, they were coming up on the base leg so they began preparing to land.

The captain had started the APU. They did not do the fuel cross feed item on the checklist because they did not have time. He did not have time to do the hydraulic system item on the checklist. They discussed the flaps and the landing bugs.

The captain initially talked to the flight attendants. F/O May was not aware of details of the conversation as he was flying the airplane.

As they were on downwind, after the autothrottles were disconnected, the captain transferred control of the airplane to F/O May so he could talk to the flight attendants. Then control of the airplane was transferred back to the captain so F/O May could finish checklists. He was asked if that was how he was trained. He said the scenario they were in was an extremely compressed period of time and they had a lot to do, so they could make exceptions. They were trained to be methodical with the checklists and not rush through anything. Whether they should finish the engine fire damage checklist before talking to F/As probably depended on the situation.

On base, he was trying to get the mechanical checklist done and get the landing speeds. There was no time to perform the one engine landing or emergency landing checklist.

They put the landing gear down when they were on final approach. The captain was not familiar with the area, so F/O May was trying to get him set up for a 4-5 mile final. The tower cleared them for a visual approach. Once they were set up on the final approach, they started to configure the airplane.

He thought the flaps were extended to 15 degrees before they extended the gear. He did not recall the altitude when gear was extended. With the left AC cross-tie out, the gear indication lights were out. They noticed it was quiet up front and the plunger was not out on the nose gear. The plunger was a mechanical link that pops out showing the nose gear was extended.

They noticed the AC cross-tie was out when they shut down the engine. They did not try to reset it. He did not recall what the procedure was for the cross-tie. At the time he was trying to get other things done. Whether he's allowed to reset the AC crosstie; he would have to look that up.

They assumed the nose gear was not down after seeing no mechanical indication. They tried to get the tower to provide information on the gear. The tower confirmed the nose gear was not down. The engine fire indication light was still on at that point. At that point, they were only about a mile from the runway at an altitude of about 300 feet. That was too close to the runway to do an emergency extension of gear. It was too close in their opinion. Captain decided to perform a go-around. They felt it was safer to take the airplane around than to land in an unknown gear configuration and possibly hurt someone.

After firing the bottles, there was not much else they could do at that point. He did not recall if they asked the tower if they could see any fire. He did not ask the F/As if there was smoke or fire in the back of the airplane. He did not know if the captain asked the F/As if there was smoke or fire in the back of the airplane.

He did not brief anything with the F/As.

The captain called for emergency gear extension checklist and the F/O performed the checklist and it worked great.

In their training, there was no problem with stowing emergency gear lever. Stowing it would allow the doors to close.

They did not retract the gear up during go around because had an unknown gear configuration.

During go-around, they retracted the flaps to 15.

ARFF chased them down the runway and was right there when they stopped. ARFF was trying to contact the captain.

They stopped the airplane as quickly as they could.

Captain talked to ARFF. F/O was talking to tower and ground. Tower told them that ARFF was up on the ground freq. F/O May said he did not ask ARFF what they saw.

They did not understand who "truck 53" was which caused some confusion about ARFF being up on the ground frequency or not.

ARFF said that everything was secure on the ground.

ARFF said there was some residual fire that they were going to spray. They sprayed it and then came back and said everything was contained or under control.

Deadheading captain was doing all the passenger announcements and talking with the F/A's. F/O May did not know what he said to the passengers or F/As.

When on they were on the ground, the situation was under control by ARFF and so the plan was not to evacuate. Does not recall captain asking his opinion about whether to evacuate.

Asked about company policy on evacuations, he said each scenario was different with respect to an evacuation. They did not have smoke or fumes in cabin. They did not have an uncontained fire outside. They did not have anything affecting passenger safety. So they decided not to evacuate.

The evacuation decision was the captain's based on what he deemed was the safest course of action for the passengers and crew.

ARFF was plugged into the wrong place on the airplane to talk to them.

When he was restoring air conditioning and opened the left hand pneumatic cross feed, to he was surprised the fire handle went in. He had not heard of that before. He did not recall whether he was given that information in training as it 5 years ago since he went through training. He was trying to put the air conditioning back on because it was hot up front and he was trying to make it more comfortable for the folks in the back.

When they were told that fuel was coming out of the engine, he pulled the handle back out. He did not recall if they asked ARFF if there was any fire at that point.

F/O May said he thought the captain misspoke when he said he planned to taxi back to gate. He did not think the captain planned to taxi to the gate. He meant to be towed to the gate.

He had never flown with the captain previously.

He said, at the time, he did not know why the fuel lever was harder to operate, but he now knew it was because the cable linkage mechanism was melted.

He was asked why it was difficult to pull the fire handle in the airplane. He said his experience was that in the simulator, the handle pulled out easy. The handle required more effort to pull than he expected. This was his first opportunity to pull the fire handle in an airplane.

He was asked about the company's single engine training and he responded that he was more than adequately prepared.

Both fire loop lights were on for the left side.

Interview: Captain James Scott Thomas
Date: November 2, 2007
Location: Phone interview
Time: 1030 EDT

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association; Tom Walsh, FAA. Captain Walsh did not have a representative.

During the interview, Captain Thomas stated the following information:

American Airlines hired him in May 1986. He was an MD-80 Captain and was the Chief Pilot at the Dallas/ Fort Worth base.

His total flight time was about 10,000 flight hours. He had about 4,000 flight hours on the MD-80 airplane. He had never had an actual engine fire during his civilian or military flying.

He said if you had an engine fire indication while the airplane was on the ground, this does not call for an immediate ground evacuation. Policy and teaching for these events was to gather as much info as you can and assess the situation before initiating a ground evacuation. Determine if you are able to put the fire out with the fire extinguishing system. You should talk to the flight attendants to determine what do they see and also ask airport fire and rescue personnel what they see. He said he would ask the ATC tower

personnel if they saw a fire on the airplane. To help assess what the situation was, he might also ask pilots in other airplanes what they saw. Ultimately he would not make a decision based on just an indication if he thought he could get more information from inside or outside the airplane.

If he received a confirmation of a large enough fire on the airplane, that might be enough information for him to initiate a ground evacuation. An evacuation decision may be airplane specific. The MD-80 airplane with the engines on the back of the tail is different than an airplane with engines under the wing. Difference to him is threat of large enough fire that folks in the tower can see it and the risk of an evacuation using the overwing exits. A consideration would be that as he starts an evacuation, he would be blocking off exits and the potential exists that someone may not hear that information. He would want to make sure that he was evacuating in the right area.

He did feel confident in his answers because he had been a check airman at American for a long time. During his time as a check airman, the teaching has been consistent to the crews regarding ground evacuation decision-making.

He was asked what he meant when he said a "large enough fire". He said that if he had an engine fire on the ground, he needed to give the fire fighting systems a chance to work if the fire was contained within the engine. If the fire was outside the engine and you could see flames, that would indicate that it was a "large enough fire".

Captain Thomas was asked what would he do if he received an indication of a fire while the airplane was in the air. He said that if there were an indication of fire in cockpit, he would ask for the Engine Fire Damage separation checklist. He would run the checklist to completion. If the fire were out, he would come back and land. If fire were not out, he would declare an emergency and come back and land. There were several additional checklists he would need to complete such as Emergency Landing checklist, One Engine checklist, and Before Landing checklist. He would also start a review of the ground evacuation checklist just in case.

He said he was aware that opening the pneumatic cross feed lever would pull the fire handle back in. He was taught that information during airplane training. That was an emphasis item in regard to getting anti-icing with an engine out. If the fire handle has been pulled and you try to establish airfoil anti-icing, you could pull the fire handle back in if you did not do the procedure correctly.

Captain Thomas was asked about the event crews' decision to go-around with a fire indication. He said this event was probably more than just an engine fire as there were a lot of things going on. At the point the gear was put down and he did not get a nose gear down confirmation, it took time to get confirmation from the tower. He said he did not know where the pilot was on the glide slope or his height above ground. He said there was no way he could really provide insight into what happened. He said that it was possible to get into a rush to get the airplane on the ground and actually get behind the airplane. He said that you should get the airplane on the ground as quickly as possible.

He conducted training in the simulator until about 8 months previously. He said that whether to move the airplane after a landing was one hundred percent a captain's decision. They were taught to stop the airplane straight ahead and set the parking brakes. You could do a couple of things to prepare for a ground evacuation. For example, you could put spoiler handle up and put the flap handle down. But other than that, you should stop where you are and assess the situation. It is possible that you could stop and if there was nothing there, taxi to the terminal. That would be a captain's decision.

He had never had an opportunity to command an evacuation in real life.

Greatest challenge in making a ground evacuation decision was that the potential of someone getting hurt is pretty high. The ultimate question that you are asking yourself is if it is safer for people to stay on airplane or safer for them to get off.

The concept of people getting hurt has been taught for a long time and was based on industry and airline statistics. There was a statistic out there that said every time that you have an evacuation; someone is going to get hurt. He felt the company guidance for an emergency evacuation was adequate. He said it was a situation that you did not encounter very often. In their main manual, the first sentence in the section concerning emergency evacuations talked about it was likely that certain passengers and crewmembers may suffer injury in an evacuation.

He did not know the captain or first officer involved in the event.

He was not aware of any changes in policy since the event.

The flight department kept the MD-80 crews informed of the event via email and the company web site contained a brief synopsis.

Engine fires were trained in the simulator during Initial and Recurrent training. The training was to a logical conclusion such as an evacuation or the fire went out.
He said he thought there was an evacuation during every training session. An evacuation was required during a R-18 Maneuvers Evaluation training which occurred every other training cycle. This training was performed with a fire indication and the AARF personnel saying there was a fire. The captain had to assess whether they had a fire that was going to make the airplane unsafe. An engine fire simulation during training does not have to end in an evacuation. He felt the company training was very adequate in that area.

Assuming you were in contact with ground crew ARFF during a real fire event, they would advise if they were able to contain the fire.

He said he was not familiar with the particulars of the event flight. The decision to go-around as they did was very subjective at that moment at that time. He believes the crew felt it was safer to go around and he doesn't question that. You have to make sure you have assessed the situation based on all outside and inside information.

Interview: Captain Robert James Lines Jr.
Date: November 2, 2007
Location: phone interview
Time: 1115

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association; Tom Walsh, FAA. Captain Lines did not have a representative.

During the interview, Captain Lines stated the following information:

His date-of-hire with American Airlines was 1985.

He had about 10, 000 total flight hours which included military and civilian flying. He had about 3,700 flight hours as captain on MD80. He had a lot of simulator and F/O seat time. He was an X-type check airman [he was allowed him to perform both simulator and line work]. An L-type check airman can only do line checks. He did quite a bit of work in the simulator. He performed a lot of line checks. Rule of thumb was one month in training and one month doing line work. He also performed initial operating experience (IOE).

He had never had a real fire indication at American Airlines (AA). Has had one in the military but it was a false fire indication. At that time, he treated it as a real fire. He had never had an actual ground evacuation. He had only done a ground evacuation in a simulator. He had watched a lot of them in the simulator. He once came close to having a ground evacuation when he had a tail compartment temp high indication. He communicated directly with the aft flight attendant. He had her illuminate area and she saw nothing.

He said part of his job was that he was one of the instructors who taught recurrent in Human Factors and also Safety Training.

When training for engine fire, in simulator they can select among several scenarios. They could have a situation where on bottle being fired put out the fire or a scenario where two bottles were needed. They could have emergency situation where there was a non-extinguishable fire. The scenario was up to the instructor and it was up to the instructor to determine how far they took it. The instructor could take it to using external resources to determine what they saw. The captain should ask the tower what did they see. They tried to get the captain to use external resources. The instructor would play the part of the tower saying what they saw.

Even if fire light indication went out, you teach crew to keep looking for indications to make sure the fire was out and the loops did not burn through. If the fire loops burned through, the crew could have a bigger fire then they think they've got.

They do have loop indicators back on the overhead panel. You look back to make sure that the loop lights are not lit.

On the MD80 airplane, it's tough for the aft flight attendants to get a look at those engines because of the placement. If it were day vmc, he would ask tower to tell him what they see. He would ask another airplane to tell me what they saw. He would contact airport rescue and fire fighting (ARFF) to tell me what do you see. Reason he was going down that road was they have presented a module to their pilots, using the evacuation safety study that the NTSB has used. It was a tough call to make to decide whether to evacuate. Are the passengers safer on board the airplane or safer outside? Every 9 months pilots go through training and they receive a 2 hrs and 45 minute segment in human factors. They talked about AAL1740 – nose gear up landing. They had cockpit crew recreate event in simulator. They discussed decisions made by captain. He described several scenarios used during training.

With a fire indication in the cockpit, he would assume is that the engine fire is real. He would use all available resources. He would contact tower and have them check out his airplane visually. He would contact AARF for an immediate assessment. He would look to see if ARFF personnel were giving him an evacuation signal or is he approaching your airplane like everything is okay. If the crew has done everything on the checklist and there is still a residual fire, he would look to communicate with AARF. He discussed a video that was shown to pilots during last training cycle. On the film were comments from a DFW aviation training instructor for ARFF who stated that if they were on scene, their confidence was high in their ability to put out any fire to make it safer so passengers do not have to evacuate. The AARF instructor was asked if there was a fire and the fuselage was intact, should they delay an evacuation. The response was yes, if we are on scene and the fuselage is intact, we recommend that you wait. The film was currently being shown to flight attendants.

He discussed several incidents where evacuations were made and somewhere evacuations were not made. If ARFF is on scene and ARFF can talk to you use that resource.

They address differences in ARFF in the class – as far as what the different indexes can provide.

If airplane comes to stop on active runway and ARFF surrounds the airplane. If AARF says there is no smoke or fire, we will clear active runway and then coordinate with AARF in assessing the situation before deciding to taxi to the gate.

He said he knew from the NTSB study, that 2 percent of anyone going down the slide would have a serious injury.

A start valve open light would not turn on the master caution light. Would get start valve open light on the annunciator panel on the overhead panel. A pilot would see a start valve open light during training. They make sure a pilot would get a scenario where a start valve failed to close. This would normally occur after an engine start so they could make sure the pilot was getting their scan right.

There was a difference between a check airman and simulator instructor. A simulator instructor was not a line pilot at AA.

One emergency can turn into more than one checklist. He stated that he would probably not give a pilot an engine fire on the left hand side accompanied by a hydraulic failure on right hand side. They did not like to compound emergencies. They like to see a pilot handle an emergency and have the correct outcome. They did not like to see a pilot struggle with multiple emergencies. He said he had an example of how an emergency could turn into multiple problems. They could have a simulator scenario where the pilot would go up to a high altitude, experience a simulated explosive depressurization, and be unable to recover cabin pressurization. This would cause an emergency descent. While in the emergency descent, the generators may fail now causing an emergency power situation. The intent would be to see if the pilot could recover the airplane using raw data only. This would be a scenario with multiple problems but they would be presented all at once.

He was asked why the 1740 flight event was put into the recurrent training. He said that it was pretty near "picture perfect". The crew had no idea that the nose gear had been damaged by the tug. When the crew arrived in ORD after flying all night, they arose to a level expertise. They felt that the captain did outstanding job coordinating with ARFF in ORD, coordinating with approach control to keep runway open. After he made a first attempt to land and the nose gear did not come down, he began to troubleshoot by communicating with Tulsa and Chicago maintenance. He had to break off a second approach. He was communicating with the flight attendants and passengers. The captain did a good job. This was a good event to discuss in training because there were a lot of areas to discuss.

The evacuation decision is the most difficult decision to make. The most hazardous situation is smoke or fire in the cabin and you don't know where the smoke is coming from. That's the toughest one to handle. If the smoke is outside the airplane, you can assess it a little more before "pulling the trigger" for a ground evacuation.

Captain Lines was asked what challenges he had in training. He said he would let a scenario come to an end and then he would ask the captain to tell me what you had in your mind as the event was occurring.

He gave an example of a scenario that he might use. He would say "this is ARFF – you have flames in your left wheel area. If the captain decides to ground evacuate, he would not have a problem with that. There would be flames in the area of "wet" wings where we carried fuel. He would ask the captain what did you see in mind. If the captain said "I saw flames in my mind licking up the strut and totally enveloping the wings". I would say "good call". If I said all that ARFF said was that "there was just a little smoke coming from the wheel area" and they surrounded your airplane. If the captain said he would run the ground evacuation checklist, I would let him run it and say "tell me what your thought process was". He would ask the captain "what did you see in your mind when I told you what the ARFF saw". Sometimes we will get the comment that they thought we needed to see a ground evacuation. I would say "No I didn't", I put the scenario out there for you to assess and decide if you needed to ground evacuate. So sometimes we get the thought process corrected in the simulator.

He said, during recurrent training, they give the captains the available statistical analysis based on ground evacuations that concerns injuries during evacuations. If a captain needs to evacuate, he needs to evacuate. He said he hoped that they were not putting into the captain's heads the idea that someone was going to get hurt during a ground evacuation. He said that was not their intent. The company's intent was that not every emergency that you land with has to lead to an emergency evacuation. Someone will get hurt. 43 of 46 floor exits had difficulty opening and passengers had difficulty during evacuations. These are all facts that a captain needs to consider. We teach that you can set up for a ground evacuation by performing the checklist, but anytime that you think it is not necessary to perform a ground evacuation, stop the checklist. He said most of our captains would prepare the cabin up to the point of calling for an evacuation and then they would ask ARFF, " ARFF, what do you see" or they would get more information before saying "Easy Victor"[1]. He tried to probe into what captains were thinking when they made a decision to evacuate in the simulator. If good reason was given – it's OK, if the reason was an expectation to evacuate then he debriefs that with the captain.

He did not know the accident crew.

We have peer observations of instructors.

During initial qualification, a pilot is trained for and has a ground evacuation. When a current MD-80 pilot came to school on a 9-month cycle – he had a R9, which was a check ride. Some scenarios on R9 check ride do not end in an evacuation. Some instructors would throw in an evacuation. On the day before a check ride, a simulator instructor pilot would give an evacuation. Bottom line was they would get an evacuation in their training. On the R18, which was not a check ride, they would get an evacuation.

Are there standardized evacuation scenarios? He could not answer that. Said we would need to talk to a standards coordinator.

Concerning the ARFF guys talking about evacuations on the video shown during training, he was asked if there was a chance of mixed message being sent to the crews? He said he was familiar with the topic area and did not see it as a mixed message. He said we needed to see the video – to see how ARFF was talking about the capabilities of the ARFF. But, the bottom line was the captain makes the decision to evacuate the airplane, period.

He was asked if there was an event like this, was there a procedure to pin gear if you've had an issue with the nose gear? He said he was having difficulty answering that, as there were too many variables.

Interview: Captain Steve Garbe
Date: May 1, 2008
Location: Phone interview

[1] Easy Victor were code words that the captain would use to inform the flight attendants to begin a ground evacuation.

Time: 1200 edt

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association.
Captain Garbe was represented by Ray Duke

During the interview, Captain Garbe stated the following information:

The F/O was the first one to notice the engine start valve light. They got an engine fire alarm shortly after noticing the engine start valve light. He said, to the best of his knowledge, he called for an Engine Fire / Damage /Separation checklist. He said they needed to return to airport as quickly as they could.

He was asked if the Engine Fire checklist was normally supposed to be performed without any interruptions. He said that would depend on the circumstances. He did not think that it was said anywhere that you must do a certain number of steps before you can do anything else. He thought initially they had done several of the steps on the checklist, but after hearing the CVR, he knew he didn't. He felt like they only had a short time before they would be on the ground and that he needed to give the flight attendants a briefing before they got onto a short final. They resumed the checklist as soon as he was done. He did not talk to the F/As very long.

They did as much of the engine fire checklist as they could. He said the checklist had a couple of different scenarios such as, do you land immediately or not. He felt they "got done" the things they needed to do to safely land the airplane. He said he could not tell us how many items on the engine fire checklist they completed.

He said he told the F/O that they did not need to review the single engine procedures or notes as he was aware of what they were. He knew it was a 28 degree flap landing.

When the electrical problems occurred, he did not have the digital flight guidance panel which meant he could not use the autopilot. His primary flight instruments were blacking out occasionally and they cycled a couple of times. Eventually his primary flight instruments stabilized and stayed on, but they were so erratic he did not really pay attention to them. There were a lot of lights that were not working and some were on. He felt he could not trust what the light indications were telling him. The whole electrical system was acting strange.

On his own initiative, he started the APU. He did not say anything to the F/O as he assumed the APU would pick up the electrical load if it could. It was running, when the F/O went through the same thought process later and went to start the APU and noticed it was already on. He said he assumed that the APU would pick up the electrical load or it wouldn't. He said if there was a reason it could not power a bus then it wouldn't. It was one of those things where you start the APU and hope it works and if it does not work, there was nothing he can do about it. Initially, they were not getting power to the left side of the electrical system. The F/O eventually reset the APU generator control relay and they got electrical power back on the electrical bus. Normally the power was picked up automatically and you did not have to reset it. They got the power back on the left

side when they were on the second downwind about to turn base. They noticed some lights that had not worked earlier such as the three green gear indicators.

On the first approach, they did not have power to the left side of the electrical system, so they did not have the green gear lights. They noticed that there was no nose gear indicator. Once they had confirmed for sure with tower that they did not see any nose gear down, they performed a go-around. Typically, during a single engine go-around, he should just say "go around' and call for flaps 11. If he had the flight director system working, he would have actuated the go around button and followed the command bars. Under the circumstances, he did not bring gear up because they had the two main gear down and he was worried they may not come back down if they were retracted.

He said he believed he called for a go-around. He thought he said to leave the gear down and called for flaps 11.

During a go-around, the pilot flying advances the engine throttles to go-around power. With the system operating normally you pushed the go-around button and the throttles advanced automatically to go-around power. He pushed the throttles up and the F/O cross checked the power settings. As they were going around and he got to the pattern altitude, he felt he was running out of thrust and felt he had some additional drag they did not have before. As he tried to push throttles forward, the F/O stopped him because he was concerned they would over boost the engines. He did not know why but thought the airplane got more flyable after they got to pattern altitude.

During the go-around, it felt like the airplane was at a normal pitch. The airplane accelerated more slowly than he expected but he knew the gear was down with its extra drag.

He typically glanced over at the flap indicators to see what they were indicating. He was pretty sure he looked over at the flap indicator gauge and saw the flaps set at 28. Ordinarily he checked both the handle and the gauge. The handle was in the detent he expected to see it in. He noticed the needles on the flap gauge were pointing down. He thought the needles were pointing at the 28 degree range, but did not recall specifically.

Both pilots were supposed to check the handle position and flap gauge.

During the second approach, he did not recall when he checked the flap position. He remembered they had electrical power restored and he saw the three green lights for the landing gear. On the second approach, he had an additional 30 knots of speed above his approach speed. He kept that extra speed because the airplane felt good, stable and controllable at that speed. He carried the extra speed until he felt the landing was assured at which point he began reducing power. He learned after the accident that the flaps had not fully extended.

When they performed the go-around, he said he was "pretty sure" he called for the emergency gear extension checklist.

After the go-around, he called for the deadheading captain to come up to the cockpit. He did not have any "specific" memory of the deadheading captain saying that there was a hydraulic failure. Captain Garbe said he did not notice there was a hydraulic failure until after they were on the ground and he was told the hydraulic quantities were full but the pressure indications were not normal.

He did not think that he used the tiller at all for steering during landing. He said he tried to use the rudder for steering. Because he only had reverse on the right engine, he had some difficulty with reverse power, so he came out of reverse. Then he used the rudder pedals to move the airplane back onto the runway centerline. He did not recall ever touching the tiller until maybe as they were coming to a stop.

Asked about the reverse difficulty, he said the right engine reverse was pulling the airplane to the right. He said that normally he could control that, but the best he could do was arrest movement to the right. He could not correct back to the runway centerline until the right engine was out of reverse.

He said he recalled that ATC said something about soot on the airplane. He recalled that the comment was said when they were at some point on the downwind leg on second pattern. He did not recall anything specific about the comment except that there was soot on the airplane.

He was asked if he would now make the same decision on whether to evacuate or not and he replied "yes". He said that all the information he gathered aided his decision. The fire chief was there at the airplane almost immediately. They were stopped under control. There was no hull breech and no evidence of smoke or fumes in cabin. There were several emergency vehicles all around the airplane. He felt it was a safer environment for the passengers to remain in their seats and inside the airplane where they would not get run over or anything. Unless there was an indication there was a more immediate need to get them out of the cabin. He said he did not know if the fire indication light was still correct. He said, "first of all", when the tower told them all they saw was soot, he had the feeling that the fire was out. Even though the fire indication light was still on, he was not "overly concerned" about a fire at that point because they still had so many strange light indications in the cockpit, even after they had gotten the left electrical bus back. Both fire extinguisher bottles had been discharged into the engine. He said no one told him there was still a fire. The F/As did not say anything either so his immediate reaction was that passengers were safest in the cabin and if there was any indication of further problems, they could do an emergency evacuation at that time.

He was asked if the residual fire was of a concern to him and he replied "not the way he described it to me". He said he was told there was a little piece of some kind of fabric hanging down below the engine with residual fire on it. He did not know who it was that told him that information, but said he was a guy who got out of a truck and was standing outside his window. The person motioned for him to open his cockpit window and said through the window that they were foaming what was a small amount of flame on the piece of fabric and they were foaming it as they talked. The person said "residual fire" – which to Captain Garbe meant "not much".

He was asked why did he leave the right engine running and he replied that he had made the determination that people were staying on airplane because they were safer there. He was concerned about their comfort. With the engine running, he had electrical power and air conditioning and he did not see any need to shut the engine down as long as they had electrical power and air conditioning. The APU was running, but he guessed that his thought process was they were better off with an extra power source for electrical and ventilation.

There was no evidence of smoke or fumes in the cabin. He said he was pretty sure the cockpit was open after they stopped. He did not see or smell any smoke or fumes. The F/As did not say anything about smoke or fumes. He was sure they would have told him. He thought Captain Martin turned around and looked back too. Captain Martin was located in the doorway.

He said he thought he made the decision to go-around. It was his decision and there was never any question in his mind about going around. He was weighing in his mind whether it was better for the passengers to land without the nose gear extended or whether it was better to try and get the gear down in a more controlled situation. His analysis suggested to him that, since they were so short on final approach, that they did not have time to extend the gear manually at that point. He was concerned that if they did not attempt to manually extend the nose gear or if it did not get extended in time for landing, the airplane would pitch onto its nose and it would throw people forward and they could get hurt. He said the F/As did not have any indication that there was going to be anything like that and they would not have been prepared. He felt it was a safer course of action to do a go-around, extend the gear, and get the airplane on the ground with three good gear.

He said he "was fairly certain in his mind" that the fire was out because they had "put both bottles in there". Also he knew they had cut off fuel to the engine and he knew with the engine being a pod mounted engine in the back, that nothing could be feeding a fire. He thought the, slipstream could keep flames from the tail. He said if the engine came off that would be a worst case scenario, but he did not think about that. He said he knew there was nothing to feed the fire and both fire extinguisher bottles had been discharged into the engine. He felt the fire was "at least minimal if not out". He said he could not trust indications in the cockpit. It was possible the fire indication light would stay on when the engine was, in fact, not on fire. He said he knew they felt they would be back on the ground within five minutes and possibly have a more stable airplane with the nose gear down. He felt this was safer for the passengers. He said that analysis took place in about five seconds because they did not have a lot of time.

He said they way they handled things, with him flying and the F/O running the engine fire checklist and talking on the radio was different that he would have normally done. He said he usually briefed that they guy flying would fly the airplane and talk on the radio while the other pilot ran checklists. He said part of the reason why things were not handled that way was he was having some difficulty controlling the airplane. He said in training, they always had the autopilot after an engine fire event, so it was easier to fly and talk and let other pilot handle the checklist. Also the F/O was a little bit of an aggressive personality so he jumped in and took it upon himself to talk. He said because

he was focused on maintaining control of the airplane, he allowed the F/O to do that. He said that was not how he had briefed. He thought the way there were doing things was working okay. He said what he had in his mind initially was to turn onto downwind, get the engine under control, brief the F/As, get the gear down, and land. He felt it was going to be such a short period of time that they needed to just get the important things done. Get the basic things done

When he briefed the F/As, he gave control of the airplane to the F/O.

He was not flying the MD-80 airplane from October 2003 when he was displaced to the B-777 as a F/O. He flew the B-777 as a F/O from October, 2003 until August 2007. He then went to training and completed MD-80 training in August 2007. He had been back on the MD-80 for about five weeks when the accident occurred.

The night before the event, he went to bed at home about 2200 and awoke about 0700. That was pretty much normal times for him. His quality of sleep was okay. He was diagnosed with sleep apnea in June, 2006. He was using his CPAP machine the night prior to the accident. He had used the CPAP machine since it was prescribed for him. He was not using any medications.

His general health was okay in the days before the event. He had a routine of taking a multi-vitamin and a fish oil capsule. He also took a dose of aspirin as a precautionary thing. He might occasionally use Afrin if he had stuffiness, but said he did not recall if he had used Afrin in the days before event.

Nothing affected performance that day.

Interview: First Officer Kevin May – second interview
Date: May 1, 2008
Location: Phone Interview
Time: 1100 edt

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association.
First Officer (F/O) May was represented by Ray Duke

During the interview, F/O May stated the following information:

They noticed an engine start valve open indication light at about 1,500 feet altitude. F/O May was the first to notice the light. Shortly after the engine start valve open light, they received and engine fire warning bell and light. He did not recall who called for the Engine Fire checklist.

He was asked how the engine fire procedure was trained in the simulator. He said that how it was done was up to the captain. He said some captains want to fly the airplane and have the F/O run the checklist. Other captains want the F/O to fly. It is usually a prebriefed thing. He said if he was told to perform the checklist, he would get it out and

start performing the items on the checklist. He said some items such as retarding the engine throttle, moving the fuel lever to OFF, and pulling the fire handle were confirmed with the captain before they were done. He was asked if the checklist was to be done completely after it was started or did that matter. He said it depended on the situation. You completed if you could, but there could be times when it was more important to get the airplane on the ground than completing the checklist. He was asked if he knew that the engine fire checklist had been interrupted and he replied that he did not know it at the time. He said he realized it had been interrupted after listening to the CVR. He said he did not know at what point it was interrupted but there was a lot to do in a very short period of time. They had to talk to the people and the flight attendants. If you had 20-30 minutes, you could get through the checklist.

When he tried to shutoff the fuel lever, it bound at the pedestal. That's where it locked up. It felt like it was held back with a spring. It felt spongy. It took both of his hands to shut it off. He said it was hard to explain but when he tried to rotate it to the off position, it stopped and was very, very spongy and stiff the rest of the way.

He said the fire handle was hard to pull out. He said that was alarming because in the simulator, the fire handle was very easy to pull out. He said that “threw him off” and, at the time, he thought perhaps it was interconnected with the fuel lever. Once he pulled on the fire handle harder, it came out. It was just more difficult than he expected.

The engine fire light remained on, so he discharged both bottles. He did not recall how long he waited before discharging each bottle and did not recall if he waited 30 seconds.

He said the captain started the auxiliary power unit (apu) and it did start on the first try.

He said that by the time he had pulled the fire handle and gotten the engine shut down, they were turning on to a base leg and he did not complete the rest of the items on the engine fire checklist. He said he then quickly reviewed the single engine approach and configuration requirements. He also did the mechanical checklist. He said there just wasn’t any time for anything else.

They were on a downwind when the engine fire warning went off. They talked between each other and determined they knew what was on the single engine landing checklist. He did not read the single engine checklist. They talked about when to configure, how much flaps to run, the landing gear. That was it, that was all there was time for. He did not recall the captain saying that he was familiar with a particular checklist and that there was no need to run it.

They did not get down to the hydraulic system on the single engine checklist as the hydraulics were not addressed if planning immediate landing. The checklist said hydraulics as required. He never touched the hydraulic panel as it was left in the takeoff configuration.

He was asked how did you complete the checklist and he replied you are trained to say checklist complete. He did not finish the engine fire checklist as he switched to a landing mode because of the time available.

He said they lost the left AC bus when the engine was shut down and the system did not crosstie. The left side of the airplane was completely dark. They had a multitude of instruments that were ac or dc powered that were dead. Basically the captain's navigational instruments were frozen or dead.

Gear indications were out and there were no green gear lights because the left ac bus was dead. Only indication that the main gears were down was to look in the periscope in the passenger cabin and the only indication for the nose gear was the plunger indicator in the cockpit. The plunger was retracted up front. He did not recall at what point he noticed that the plunger was retracted. The first thing he noticed was that the three green indicators were out.

The captain's navigation displays were out. His FMA was out. He did not know what was working on the captain's side. The navigation displays were working on the F/O's side. His flight guidance panel was out though.

The F/O said he noticed the nose gear pin was retracted. He called the tower and asked them to confirm the gear was down. He did not recall exactly what altitude they were at when the tower responded that the nose gear did not appear to be down. He said his best guess was they were 200-300 feet above the ground. He did not recall if anyone called for the go-around. He said the captain just did the go-around. He said you usually did the normal flaps and gear which was standard, but there was nothing standard about the go-around and they had to make exceptions. He said he brought the flaps up but the left the gear down. He did not recall any callout of go-around power, but said it would not have made a difference because the thrust rating indicator (TRI) was out. They had the engine pressure ration (EPR) gauges but did not have the TRI which would have used the autothrottles to give them go-around power. The captain was using manual throttles and had them at 2.03 EPR because he was concerned about over boosting the right engine. 2.01 to 2.02 EPR would be normal takeoff thrust and go around thrust would be a little bit more. The exact setting would be dependent on temperature.

During the go-around, he retracted the flaps and checked the flap position by looking at the flap handle primarily because the flap indicator gauge was out or frozen.. He felt like the flap indicator gauges were worthless because of electrical problems.
On normal approach, the normal response to the checklist was "28, 28, land". You checked the handle position and the gauge to make sure the flaps were in the right position. "Land" was determined from an annunciator light.

The pitch of the airplane seemed normal. He did not recall if the captain set the airspeed bug speed that he had given him for the approach and landing. F/O set his bug speed. To the "best of his recollection", they were operating at an airspeed of about 180 kts. while in the pattern and at an airspeed of about 160 kts. when they were on the final approach. He said he did not recall if or when the captain slowed the aircraft below 160 kts.

During the go-around, the captain called for flaps. He thought the captain called for flaps 15. The F/O said he moved the flap handle. He did not use the gauge as he felt it was unreliable.

He did not recall what altitude they climbed to.

After the go- around, he did not recall the deadheading captain mention there was a hydraulic failure and he did not recall noticing there was a hydraulic failure. He did not think that any of them knew the extent of the hydraulic problem until they were on the ground.

There was no emergency evacuation and he said he agreed with the captain's decision. He said the passengers were in a safe contained environment and there was no smoke or flames in the cabin. He had no concern about the residual fire at the engine. The engine fire indication light remained on and did not go out.

The after landing checklist was not done. They cleaned up airplane as they normally do when they're on the ground. He said that he could not tell us which items were cleaned up without a checklist.

He was asked why they kept the right engine running and he responded that gave them two power sources - right engine and apu. It was not a safety threat to anyone to keep the engine running working, so they kept it running.

The after landing checklist was done silently. There was no discussion about leaving flaps down. He did not recall even moving the flaps up.

He was asked how did knew there was no smoke or flames in the back of the airplane. He responded that there were three F/As in the back and that was something they would relay to them. They had numerous communications with the F/As and they never stated anything out of the ordinary.

He said the lack of a discreet frequency complicated things. The controller was talking to others and they had to wait to talk to him.

He came from a single seat environment. They were trained to talk to ATC and work radios at the same time. How the duties were divided in the cockpit was a technique. He did not see it as a problem.

His health was “fine”. He was not taking any medications at the time of the event. The night before the event, he went to bed at about 2000 and awoke about 0400. He had a normal sleep. He normally goes to sleep about 2200 and awoke at about 0600. He was off for a few days prior to the event. He had no sleep disorder. He did not think that anything affected his performance.

The after landing procedures were taught as a flow and were not spoken.

He was asked about the go-around and he responded that he did not recall any verbal communications concerning the go-around. He said the go-around was a split second decision on both their parts and said they both acted at the same time. During the go-around, he did not recall any communications from ATC concerning the exterior of the airplane.

The APU started up the first time they tried it, but it did not go on-line electrically. He said he reset the APU generator relay. When he reset the APU generator, the electrical power did go to both sides of the electrical system. He did not recall exactly when the APU generator relay was reset but said it occurred after the go-around and thought it occurred late in the second downwind just before turning base leg. The captain's instruments returned then. He did not recall if the hydraulic or flap gauges were working normally after the reset.

Interview: Captain Cal Phillip Martin, (deadhead/jumpseat rider)
Date: May 1, 2008
Location: Phone interview
Time: 1330 edt

Operations Group members present were David Tew, Evan Byrne, NTSB; Mark Maestas, American Airlines; Kevin Elmore, Allied Pilots Association.
Captain Garbe was represented by Ray Duke

During the interview, Captain Martin stated the following information:

His date of hire with American Airlines was September 1987. He had about 16,000 to 17,000 total flight hours. As a F/O on the MD-80, he had about three years flying experience and about 2,500 flight hours. As a captain on the MD-80, he had about six years flying experience and about 4,000 flight hours.

He had flown the accident airplane for several flights prior to the accident flight. The electrical portion of the start valve had been written up as inoperative. They had to perform manual starts. He had picked up the airplane in San Antonio, Texas on the day before the accident. He flew it from San Antonio to Chicago, Illinois; he then flew it from Chicago to Montreal, Canada where they overnighted with the airplane. The next morning they flew the airplane back to Chicago and then flew it to Saint Louis, Missouri. He flew a total of four legs on the airplane.

They had no problems starting the engine manually. They did have a bit of problem with contract maintenance personnel in Montreal that was due to communications. He never saw any flicker of start valve during flight. He did see it during the start process which was normal. The times the start valve light should have been out it was out.

His first clue of the problem occurred when the cockpit door popped open. He could hear the voice alarm going off in the cockpit saying fire left engine. When he was sitting in the back of the airplane, he could not hear any discussion among the crew. He went up to

the cockpit after they had performed the go-around. He did not remember word for word what he was told in the cockpit. Initially, he got a 10 second thumbnail sketch of what had happened and was asked if he had any ideas to help. He looked around the cockpit and saw a lot of lights on. He could not figure out what the problem was by looking at the lights as most everything was on. He was asked if he saw anything that they had missed. We were about mid field on a downwind leg at that time. The captain had his hands full flying the airplane which meant that his priority was focused on flying the airplane. The captain asked him to assist the F/O.

On downwind, there was a short discussion of emergency gear extension and the F/O grabbed the checklist. Things were rushed and the F/O ran through the checklist real quick. Shortly after that, Captain Martin was asked to coordinate with the F/As. He was talking on the passenger address system and coordinating with F/As. The F/As did not mention any anomalies in the cabin.

Things were happening fairly quickly as they turned base and made a short approach. He did not recall at what point the gear was extended. His best recollection was that the gear was extended somewhere between the downwind and the base leg.

He did recall that as he was looking around at everything and trying to determine why the gear did not go down. He recalled that there was no hydraulic press in the system which was why the gear did not go down. He did not recall if both gauges were indicating no pressure. He remembered seeing something in the hydraulic system that was not expected. He thought perhaps the left system was indicating 0 and the right system was indicating some pressure. He said he did not remember exactly what he saw. He did not recall what the hydraulic quantity gauges were indicating. He thought the other pilots might have been aware of the hydraulic anomaly and said he was not sure that he was the one that discovered it.

When the flaps were being extended, he did not notice the flap gauges.

He was asked what happened after the airplane was brought to a stop. He replied that the first thing that happened was they got airplane stopped and set the brakes. He said that AARF was right there when they stopped. Captain Garbe opened his window talked with the AARF chief. Captain Martin said he opened the cockpit door and was talking to the #1 F/A who was seated on the F/A jumpseat. He conversed with the F/As face to face. He did not know what conversation transpired between Captain Garbe and AARF. They were talking about the situation.

Captain Martin remembered the topic of the conversation with the F/As was that everything was good. He tried to reassure them that they were not in any immediate danger. He took a look back to see if there was any panic in the cabin among the passengers. He said there was a lot of looking around and conversation but everyone remained seated and were relatively calm. He said Captain Garbe made a decision not to evacuate immediately and his conversation with the fire chief confirmed that. He said they wanted to make sure someone did not start something inappropriately. He was asked if he would have made the same decision not to evacuate the people immediately

and he responded “absolutely”. He said it seemed like more people got hurt in an evacuation than any other event. He said their goal was not to “bend anything or hurt anybody”.

He said the crew was working together just like they were trained. He said it was an unusual situation and was not like anything they got in training. The crew had to pull pieces of different procedures together and they were doing a good job. Everything was well coordinated.

The main cabin door [L1] was opened long after they were stopped. An airstair was brought to the door and the fire chief wanted to come aboard and check the cabin for fire, smoke, or fumes. He estimated it was 5 to10 minutes or longer after they had stopped until the main door was opened. He said two guys walked onboard the airplane and walked all the way to the back of the airplane checking for fire, smoke, or fumes.

He said the F/As were at their positions after they landed and stopped. He did not recall that anyone was “up and about” initially. He said he was initially talking to just the lead [#1] F/A but that after a few minutes, the other F/As came forward because they wanted to get an idea of what had happened and what was going to happen. He passed along the information that he had.

He was asked if there was anything he thought could be improved as a result of the incident. He said that when he came into the cockpit, the crew had ATC on the overhead speaker and that ATC was handling tower and ground duties together. As they were on a short final, the tower was talking to an airplane giving clearance to taxi. He said he thought that seemed a bit inappropriate. If the pilots needed to communicate with tower immediately, they would have had to work through a lot of interference on the frequency. It would be nice if a single frequency approach setup would be done. He said it was important that ATC, the fire chief and the aircraft are on the frequency, but you do not want any extraneous conversation in the way.