STATEMENT OF

CAPTAIN TERRY MCVENES, EXECUTIVE AIR SAFETY CHAIRMAN

AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

BEFORE THE

SUBCOMMITTEE ON DISASTER PREVENTION AND PREDICTION

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

WASHINGTON, DC

March 16, 2006

Volcanic Hazards – Impacts on Aviation

Air Line Pilots Association, Int'l
1625 Massachusetts Avenue, NW
Washington, DC 20036
(202) 797-4033

STATEMENT ON VOLCANIC HAZARDS – IMPACTS ON AVIATION

STATEMENT OF
CAPTAIN TERRY MCVENES
EXECUTIVE AIR SAFETY CHAIRMAN
AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

BEFORE THE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
SUBCOMMITTEE ON
DISASTER PREVENTION AND PREDICTION

U.S. SENATE
MARCH 16, 2006

VOLCANIC HAZARDS – IMPACTS ON AVIATION

Mr. Chairman and Members of the Subcommittee, I am Captain Terry Mc Venes, Executive Air Safety Chairman of the Air Line Pilots Association (ALPA), which represents more than 60,000 professional pilots who fly for forty commercial airlines in the United States and Canada. ALPA appreciates this opportunity for me to appear before you today to join with members of government and the aviation community to discuss volcanic hazards and the impacts on aviation.

DISCUSSION

Historically, 1330 volcanoes worldwide have demonstrated indications of activity over many thousands of years. More than 500 of them have shown some activity in recent history, but constant monitoring is currently only available on 174 volcanoes and yet, worldwide, there are 50 to 60 eruptions per year. From 1980 to 2005, more than 100 turbojet aircraft have sustained at least some damage after flying through volcanic ash clouds, resulting in cumulative damages of over $250 million dollars. At least 7 of these encounters have resulted in temporary engine failure, with 3 aircraft temporarily losing power from all engines. Engine failures have occurred at distances from 150 to 600 miles from the erupting volcanoes. Ash related aircraft damages have been reported as far as 1800 miles from a volcano eruption.

The eruption of a volcano located in a densely populated area of the world can produce catastrophic consequences for those in its vicinity. Because the ferocity of volcanic eruptions bring potential danger to life and property, the most active of them usually have seismic monitors near them, and networks of observatories and scientists with reactive plans to transmit warnings, evacuate population and protect life. Volcanic activity is usually obvious to those in close range and public reports may be as plentiful as those

from the scientific community. As a necessary adjunct to those plans, aviation authorities must be notified so that air traffic may be re-routed to avoid potential danger.

Volcanoes located in sparsely populated regions present a vastly different problem because most are unmonitored, and reports of activity may be either extremely random or non-existent. Warnings to the aviation community may never be given, and the first indication for an aircraft in the area may be an inadvertent encounter with the ash cloud. Many of the volcanoes around the rim of the Pacific Ocean fall into that category. Volcanoes along the western coasts of North and South America, the Alaskan Aleutians, the Kamchatkan Peninsula, and the Asian coastal regions South to Australia, form what geologists refer to as the Pacific Ring of Fire. The majority of the Ring's volcanoes are un-monitored, yet some of the world's busiest air navigation routes crisscross these areas. Turbojet aircraft exposed to heavy concentrations of volcanic ash are in grave danger. Multi-engine commercial aircraft encountering ash clouds have suffered severe consequences as a result. As an example, KLM Flight 867, a Boeing 747 with more than 240 passengers aboard, encountered the 1989 eruption of Mt. Redoubt near Anchorage, Alaska. Review these transmissions between Anchorage Center, the air traffic control facility for that region, and KLM 867 ……

Video/Voice/Recording plays for 57 seconds for Members and audience at hearing …

PILOT KLM B-747 – "KLM 867 HEAVY IS REACHING {FLIGHT} LEVEL 250 HEADING 140"

ANCHORAGE CENTER - "OKAY, DO YOU HAVE GOOD SIGHT ON THE ASH PLUME AT THIS TIME?"

PILOT KLM B-747 – "YEA, IT'S JUST CLOUDY IT COULD BE ASHES. IT'S JUST A LITTLE BROWNER THAN THE NORMAL CLOUD."

PILOT KLM B-747 – "WE HAVE TO GO LEFT NOW… IT'S SMOKY IN THE COCKPIT AT THE MOMENT SIR."

ANCHORAGE CENTER – "KLM 867 HEAVY, ROGER, LEFT AT YOUR DISCRETION."

PILOT KLM B-747 – "CLIMBING TO {FLIGHT} LEVEL 390, WE'RE IN A BLACK CLOUD, HEADING 130."

PILOT KLM B-747 – "KLM 867 WE HAVE FLAME OUT ALL ENGINES AND WE ARE DESCENDING NOW!"

ANCHORAGE CENTER – "KLM 867 HEAVY ANCHORAGE?"

PILOT KLM B747 – "KLM 867 HEAVY WE ARE DESCENDING NOW … **WE ARE IN A FALL!"**

PILOT KLM B-747 – "KLM 867 WE NEED ALL THE ASSISTANCE YOU HAVE SIR. GIVE US RADAR VECTORS PLEASE!"

To classify this encounter as one presenting grave danger for those 240 passengers and that crew is an understatement! All four engines of this aircraft failed within 59 seconds! A false cargo compartment fire warning indication required special attention by the crew. All normal airspeed indications failed! The avionics compartments containing all of the radio, radar, electronic systems monitoring, and communications systems, all overheated and individual systems failed. The sophisticated electronic cockpit displays became an electronic nightmare. While ash was contaminating the engines and causing them to flame out, it was also contaminating electrical compartments and shorting electronic circuit boards. This four engine jumbo jet was essentially a glider for several minutes until the crew was able to individually re-start engines. Three of the engines eventually re-started but delivered reduced performance. The fourth engine eventually came on line when the aircraft was on final approach to Anchorage. Although the crew landed safely, the encounter caused $80 million dollars damage to the airplane. Under only slightly different circumstances, 240 plus fatalities and a total hull loss could have been the result.

KLM 867 was only one of several commercial aircraft exposed to varying amounts of damage during several days of volcanic activity from Mt. Redoubt. Anchorage is one of the world's busiest airports for both passengers and cargo. The eventual economic impact of aircraft damages, cargo delays, passenger flight delays and cancellations, and general disruption to the Alaskan economy was staggering. Every commercial aviation operation in or through that territory suffered economic consequences.

Mt. Redoubt was monitored, and the system of warnings was activated, but the capability to detect and predict the ash movement, and to track the cloud, was not as sophisticated in 1989 as it has become today. Nor were the commercial flight crews as aware of the hazard, or as specifically trained to deal with avoidance or escape, as many have been trained to do today.

In an earlier encounter near Jakarta, Indonesia, a British Airways Boeing 747 had a similar experience at night when Mt. Galungung erupted and propelled ash to flight altitudes without warning. That BA crew was enveloped in ash, lost communications because of the electronic interference, flamed out all four engines, and was left without assistance until just before an emergency landing. With communications lost, most aircraft systems failed, and pure visual pilotage to navigate to safety, they also successfully avoided what could have been fatal consequences.

PROGRESS

The capability for today has improved. Both geostationary and polar orbiting satellites employ sensors to detect eruption gasses and to depict cloud movement. However, industrial priorities must constantly be justified and funding made available to insure that those capabilities continue on future replacement satellites. Shifting priorities and shrinking federal budgets have lessened the satellite capabilities in recent years. Operational plans are employed throughout the world to maintain communications priorities to transmit volcanic ash hazard warnings and notices within the aviation community. Since 1989, two international volcanic ash and aviation safety conferences have been held to bring the scientific and aviation communities together to refine and improve prediction, detection, and monitoring of the hazard; and to improve training, operational procedures, and communications and warning strategies within the aviation community.

REMAINING PROBLEMS TO BE ADDRESSED

In spite of the satellite umbrella, seismic monitors are needed around the world, especially in sparsely populated areas where communications are not fully developed. The Mariana Islands, for example, have volcanoes throughout their territory. Mt. Anatahan, the most active, has only minimal seismic monitoring plus a backup instrument on nearby Pagan. It has had eruptions for the last three years, including a stretch of five straight months of activity propelling ash clouds to cruise flight altitudes. Flights to the islands have been disrupted, and there have been deviations of commercial traffic flying air routes over the islands. Though Guam and Saipan are usually excellent en route alternates for over flights, volcanic activity introduces special emergency fuel and weight limiting procedures for long-range twin-engine commercial aircraft. These special procedures and diversions have cost carriers in the millions of extra operating dollars. In addition, U.S. military operations around Guam have been frequently postponed or cancelled, driving DOD expenditures there higher. A wider array of monitoring in the Marianas could improve predictability, allow earlier warnings for the air traffic system, and reduce unnecessary reroutes and/or cancellations in this important area of the world.

LESSON SUMMARY

- Potentially active volcanoes, especially in remote locations, should be seismically monitored 24/7
- Geologic observatories must coordinate closely with regional air traffic authorities to insure that warnings are disseminated as soon as possible.
- Commercial operators should insure that flight crew training curricula address the normal and emergency procedures for hazard avoidance and inadvertent encounters.
- The Congress and U.S. Government agencies should be cognizant of the volcanic hazard and its impacts on aviation, in order to understand the technical and

financial support required to maintain the necessary detection and prediction resources. Aspects of this program are shared by the U.S. Geological Survey - USGS, the Smithsonian Institution, the National Oceanic and Atmospheric Administration - NOAA and its National Weather Service - NWS, and The Federal Aviation Administration – FAA. All of their administrative budgets must be annotated in support of shares of that responsibility.

CONCLUSION

Commercial turbojet aircraft are certified with multiple redundant systems to prevent total system failures. Yet even they can be rendered helpless by volcanic ash. Therefore, detection, prediction and dissemination strategies are essential to avoid the hazard. Either we will identify a turning point in our understanding of the volcanic hazards and the impacts on aviation, or we will continue on our present course and accept the hazards of the encounters that we have reviewed. Continuing on our present course may produce fatal results.

Mr. Chairman, I appreciate the opportunity to share ALPA's views on this important matter, and I will be happy to answer any questions you and the other Members of the subcommittee may have.