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PREPARED FOR:

DATE: [redacted]-Feb-96 07:22am

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Model: 737 ATA: 0240-00

Subject: WAKE TURBULENCE ENCOUNTER

DIR PURVIS

/ATTN J. PURVIS MGR - AIR SAFETY INVESTIGATION

FEB 96
ATA 0240-00 MODEL 737
WAKE TURBULENCE ENCOUNTER
AIRPLANE HOURS/CYCLES

FOLLOWING MESSAGE SENT TO J. PURVIS

AT APPROX 0845 HOURS , THE DATA APL ENCOUNTERED WAKE TURBULENCE FROM A 727 APL APPROX 3.0 MILES AHEAD. THE DATA APL WAS ON FINAL APPROACH INTO FROM FLT

THE DATA APL WAS ON THE LOCALIZER CENTER FOR RUNWAY AT APPROX 3000 MSL (2000+ AGL). THE PILOT IN COMMAND REPORTED THAT THE APL WAS IN A SMOOTH DESCENT, APPROX -700 FPM, WHEN THE APL ENTERED THE WAKE TURBULENCE. THE APL THEN ROLLED FIRMLY AND SMOOTHLY INTO A LEFT BANK. THE PILOT IN COMMAND COUNTERED WITH OPPOSITE AILERON INPUT. THE PILOT IN COMMAND ADVISED THAT MAXIMUM RH AILERON INPUT WAS APPLIED, YET THE APL REMAINED IN AN APPROX 25 DEGREE LH BANK. FIREWALL PWR WAS APPLIED TO MAINTAIN ALT. SPEED AT THE ONSET WAS 180 KNOTS INDICATED, FLAPS SET TO //2//. AFTER APPROX 20-40 SEC THE APL ROLLED RIGHT AND THE WINGS WERE LEVELED.

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SPD AFTER THE TURBULENCE WAS NOTED TO BE 200 KIAS PLUS, ALT WAS ESSENTIALLY UNCHANGED.

THE PILOT IN COMMAND HAD A CHECK CAPT IN THE RH SEAT. THE APL CONTINUED TO LAND AND TOUCHDOWN WAS APPROX 0903 HOURS . TIME.

THE DATA APL WAS LANDING BEHIND FLT
(727-222, . FLT LANDED AT 0840 HRS LOCAL.
THE FLT AHEAD OF WAS FLT
(DC10-10) WHICH LANDED AT 0839 PER COMPUTER RECORDS.

THE WEATHER AT 1550Z WAS:

FROM THE TOWER: CLEAR. VISIBILITY 10 MILES (PLUS) TEMP 38 /F/ DEW POINT 32 DEGREES /F/. WINDS WERE CALM.

WX AT 1450Z: TEMP 35 DEGREES /F/ WINDS 280 AT 03

FROM THE NATIONAL WEATHER SERVICE AT O'HARE INTL AIRPORT:

0656 L/T WIND 290/5 TEMP 31 DP 29
0756 L/T WIND 290/8 TEMP 32 DP 30
0856 L/T WIND 270/6 TEMP 35 DP 31

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AFTER ARRIVAL AT THE GATE, THE FLT CREW DEBRIEFED WITH MAINT AND FLT OPS. THE APL WAS ALLOWED TO CONTINUE AS FLT)
RETURNED TO AT 1144 HOURS LOCAL TIME. THE FLT DATA RECORDER P/N 17M303-282 S/N OFF 279 S/N ON WAS REMOVED. MR. TOM HAUSTER/NTSB IN WASHINGTON, D.C. IS COORDINATING THIS EFFORT WITH

ACTION: FYI

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NTSB

ATTACHMENT 5

WITNESS INTERVIEW
Captain Steve Ellis
United Airlines

Malcolm Brenner and Chuck Leonard conducted a telephone interview of Captain Ellis on February 16, 1996. He was the pilot of a B-737-200 passenger flight that experienced a wake turbulence encounter behind a B-727 airplane on February 9, 1996. Additional participants in the telephone interview were Bill Yantiss, United Airlines Safety Office, and Marilyn Pearson and Pete Delo, ALPA-United Pilot's Association.

This was the second leg of an initial operating experience (IOE) training flight, with check pilot Robert Schmidt conducting training from the right seat. Captain Ellis had about three flight hours in this model aircraft as captain, 2000-3000 hours as first officer in the B-737 Model 300, and about 14,000 total flight hours.

This incident occurred at 0830 hours, in daylight conditions, surface winds 300/08, with greater than 10 miles visibility and a clear horizon. The airplane was on approach to Chicago's O'Hare Airport (ORD) and was established on the glide path three miles behind a B-727, according to TCAS. Airspeed was 180 kts, flaps position was 2 degrees, the airplane was manually flown, and altitude was about 3000 feet MSL.

The incident began with a "lateral burble" that Captain Ellis recognized as a typical wake turbulence entry. The airplane began rolling hard to the left. Captain Ellis counteracted the roll with what he thought to be full aileron and rudder input but the airplane did not roll back to a level attitude. The aileron wheel was vertical and the rudder pedal was not quite against the stop. Aileron and rudder were input at the same time. The rolling motion stopped, the airplane shuddered (not buffet), but it remained hanging in a left bank as it continued descending. Captain Ellis felt that the controls stopped the rolling motion but that little authority remained to return the airplane to a level attitude. The maximum bank was about 20-25 degrees. Captain Ellis was concerned that the wake turbulence might be strong enough to cause the airplane to go inverted and was very conscious of the need to maintain a level pitch attitude.

The airplane "snapped" right for a moment, then returned into the vortex induced left bank. Captain Ellis advanced the power to just above the go-around setting and called for a go-around. The airplane sped up immediately and escaped the wake turbulence, breaking out the top at above 200 knots airspeed.

Captain Ellis had flown into wake turbulence many times before, and he recognized this as a wake turbulence encounter. He was confident that there was no yaw damper problem or other airplane malfunction. The airplane was responding properly. He did not know why there were two periods to the encounter. Other wake turbulence encounters were not nearly so violent as this one and did not last as long. There was extremely strong shuddering, although not like stall buffet. Once, as a first officer, he had observed a similar incident handled by the captain.

Captain Ellis had undergone unusual attitude training as a helicopter pilot in the military and as a candidate for an instructor rating. He recently completed the Advanced Maneuvers training at United Airlines, and was very conscious of this training while the event was happening. The training

stressed aggressive use of all controls, especially rudder, and awareness of pitch attitude if the airplane rolled over. It was important to keep the pitch attitude level.

NTSB
ATTACHMENT 6

WITNESS INTERVIEW
Captain Robert Schmidt
United Airlines

Malcolm Brenner and Chuck Leonard conducted a telephone interview of Captain Schmidt on February 16, 1996. He was giving IOE training to Captain Ellis from the right seat of the B-737 flight that experienced, on February 9, 1996, a wake turbulence encounter behind a B-727 airplane. Captain Schmidt was interviewed independently of Captain Ellis. Additional participants in the telephone interview were Bill Yantiss, United Airlines Safety Office, and Marilyn Pearson and Pete Delo, ALPA-United Pilot's Association.

Captain Schmidt said he was looking inside the cockpit when the incident began. The flaps were at two degrees, the airspeed was 180 kts., and the airplane was three miles behind a B-727 as measured on the TCAS. He felt like they were entering wake turbulence and the airplane began to roll. He observed that Captain Ellis put in the correct aileron and rudder commands, but the airplane rolled to a 25 degree bank and held in this position. With regard to aileron use, the captain's top hand was at an 11 o'clock position where a 12:30 o'clock position represents full use.

Captain Schmidt has 11,000 hours total flight time, of which 3000 hours were in the B-737-200. He said he had never previously encountered a wake turbulence experience like this where the airplane would not come out of the encounter. He had experienced wake turbulence frequently in military formation flying in the C-130, but said you could feel the burble and control the encounter with primary controls. He had encountered wake turbulence rarely in civilian flying, usually flying perpendicular to it and feeling a "short burp." He had never before seen an airplane just hang there, with the control surfaces able to stop the roll but nothing more. He believed the aircraft glide path was the same as the vortices. With go-around thrust added (still flaps at 2), the nose rose enough to fly out of the descending vortices, causing the aircraft to accelerate to 210 knots, thus regaining normal flight control response. They were able to complete the landing safely.

Captain Schmidt said that it never occurred to him that there might be anything wrong with the airplane, because the initial burble and the roll were familiar wake turbulence experiences, and Captain Ellis did not complain about the controls.