

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

December 28, 2009

Cockpit Voice Recorder - 12

Specialist's Factual Report
By James Cash

A. EVENT

Location:	Reno, NV
Date:	September 5, 2008, 1808 Pacific Daylight Time (PDT)
Aircraft:	Lockheed Electra SP-2H, N4235T
Operator:	Neptune Aviation, Neptune 09
NTSB Number:	SEA08GA194

B. GROUP A group was not convened.

C. SUMMARY

On September 5, 2008, a Lockheed Electra SP-2H, registration N4235T operated by Neptune Aviation, crashed on takeoff in Reno, NV. A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board's Audio Laboratory for readout.

D. DETAILS OF INVESTIGATION

On September 5, 2008, the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model:	Universal CVR-30-B
Recorder Serial Number:	2225

Recorder Description

Per Federal regulation, CVRs record a minimum of the last 30 minutes of aircraft operation; this is accomplished by recording over the oldest audio data. When the CVR is deactivated or removed from the airplane, it retains only the most recent 30 minutes of CVR operation. This model CVR, the Universal CVR-30-B, records 30 minutes of

digital audio stored in solid-state memory modules. Four channels of audio information are retained: one channel for each flight crew and one channel for the cockpit area microphone (CAM).

Recorder Damage

Upon arrival at the audio laboratory, it was evident that the CVR had sustained significant heat and structural damage to the recorder. The memory from the accident unit was removed and placed in an identical chassis for download. The accident audio information was extracted from the recorder.

The 31-minute recording consisted of three channels of useable audio information. Each channel's audio quality is indicated in the table.

Channel Number	Content/Source	Quality
1	Captain	good
2	Ist Officer	good
3	Not connected	N/A
4	CAM	good

Timing and Correlation

Timing on the transcript was established by correlating the CVR events with the approximate time of the accident as provided by the Investigator In-Charge (IIC)

Audio Recording Description

The recording consisted of four channels of audio information. The recording started just as the aircraft was taxiing in from the previous flight. The aircraft's engines were shutdown and electrical power was removed from the CVR for some unknown period of time. Power was then re-applied to the CVR and the recorder ran continuously until the end of data at approximately 1808:32 PDT. In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of the events found on the accident portion of the CVR recording was prepared. (Attached)

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* See attached CVR Quality Rating Scale.

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice recorder information:

Excellent Quality	Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other.
Good Quality	Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other.
Fair Quality	The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information.
Poor Quality	Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information.
Unusable	Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system.

Summary transcript of a Universal Model CVR-30B Solid-State cockpit voice recorder, serial number 2225, installed on a Neptune Aviation, Lockheed Electra SP-2H, N4235T, which crashed after takeoff from the Reno Airport, Reno, Nevada

LEGEND

CAM	Cockpit area microphone voice or sound source
INT	Flight crew intercom voice or sound source
RDO	Radio transmissions from N4235T
-1	Voice identified as the captain
-2	Voice identified as the first officer
*	Unintelligible word
()	Editorial insertion

Note 1: Times are expressed in local Pacific daylight Time.

Local Start	Source	Text
		start of recording - aircraft on ground taxiing back to ramp
		aircraft's engines are shutdown
1742:38.6	CAM	power interruption to CVR only one person in cockpit
1743:22.3	CAM-1	cell phone conversation
1745:20.8	CAM-1	cell phone conversation
1748:18.9	CAM-1	cell phone conversation
1758:54.7	CAM-1	sound of engine starting
1759:09.0	CAM-1	starting of 2nd engine
1800:29.4	INT-2	"after start complete"
1801:32.8	INT-1	Captain briefed where they were going on the map - near Reno
1803:45.6	RDO-2	called for taxi to runway three two
1804:04.6	INT-1	Captain said " go ahead and start your engines"
1804:05.3	CAM	sound of turbine engine starting
1804:32.6	CAM	sound of 2nd turbine engine starting
1805:06.7	RDO-2	speed bugs set right
1805:07.5	INT-1	on the left
1805:08.9	INT-2	flaps are ten
1805:10.3	INT-1	set and indicated
1805:12.3	INT-2	master props
1805:13.2	INT-1	on two - lights forward
1805:14.7	INT-2	* Normal - trim?
1805:16.0	INT-1	okay we got one - two - three - *
1805:19.3	INT-2	we got about eighty degrees
1805:24.9	INT-1	set on the left - instrument got fifty fifty
1805:28.0	INT-2	fifty fifty- instrument's set right - radios are set
		mixture's are rich - fuel panel main direct - cross feed is off - * are going - pump's are on
1805:33.0	INT-2	- emergency drop is guarded - tank system is powered up
1805:44.3	INT-2	briefing

Okay this will be a VFR departure off of runway three two- same numbers same calls - ah is we get it into the air we enter a left downwind come back around for three two - I don't want to pack a load - any questions?

1805:45.5 INT-1

1806:01.5 INT-2 cowl flaps and control lock - time on the lineup - before takeoff is complete

1806:09.3 INT-1 "Actually this will be your takeoff"

1806:14.4 INT-2 "Same briefing" (sound of laugh)

1806:18.7 RDO-1 Aircraft calls traffic and takes runway three two

1807:05.8 CAM sound of increasing engine speed

1807:16.5 INT-2 got rudder control

1807:27.7 INT-1 eighty cross checked

1807:38.9 INT-1 one oh eight - rotate

1807:43.9 INT-2 positive rate

1807:55.5 INT-2 METO power

1808:00.2 CAM sound of decreasing engine speed

1808:05.4 INT-2 "Whoa" (sound of heavy breathing)

1808:10.5 INT-1 "we got a fire over here - a big oh fire"

1808:15.2 INT-2 I'm holding full right aileron

1808:28.8 INT-1 (sound of heavy breathing)

1808:30.0 INT-1 several expletives

1808:31.0 INT-1 (sound of heavy breathing)

1808:32.3 CAM sound of impact- end of recording