

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR22FA253

MEDICAL

Specialist's Factual Report

May 10, 2023

A. ACCIDENT

Location: Buffalo, Wyoming
Date: 7/14/2022
Time: 12:31 Local
Airplane: Cessna P210N; N731BJ

B. MEDICAL SPECIALIST

Specialist Michelle Watters, MD, PhD, MPH
National Transportation Safety Board, RE-1
Washington, DC

C. DETAILS OF THE INVESTIGATION

Purpose

This investigation was performed to evaluate the pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

Methods

The Federal Aviation Administration (FAA) medical case review, the pilot's autopsy report, and FAA Forensic Sciences Laboratory toxicology report¹ were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION–PILOT

1.0 FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 52-year-old male pilot held a second class FAA medical certificate without limitation. His most recent FAA medical certification exam was on 11/29/20 and at that time he reported he had accrued 4,000 total flight hours. He was 72 inches tall and weighed 215 pounds. He reported no medication use and no medical conditions.

2.0 Autopsy

According to the autopsy report prepared for the Johnson County Coroner, Buffalo, Wyoming, the pilot's probable cause of death was multiple blunt traumatic

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1,000 substances including toxins, common prescription and over-the-counter medications, and illicit drugs.
<https://jag.cami.jccbi.gov/toxicology/>

injuries from airplane crash (instantly). The examination was limited by extensive trauma; the pilot's brain, heart, and lungs were not available for examination.

3.0 Toxicology

Toxicology testing performed by the FAA Forensic Sciences Laboratory detected ethanol in the pilot's muscle tissue at 0.027 grams per hectogram (gm/hg),² but not in his liver tissue. N-propanol was also detected in his muscle tissue but not in his liver tissue. Tissue samples were described as having undergone putrefaction. The antianxiety medication diazepam was detected in the pilot's liver tissue at 12 nanograms per gram (ng/gm) but not in his muscle tissue. Diazepam's metabolite temazepam was detected in liver tissue at 503 ng/gm and muscle tissue at 121 ng/gm; its metabolite oxazepam was also detected in liver tissue. The high blood pressure medications chlorthalidone and atenolol were detected in the pilot's liver and muscle tissue; these two medications are generally considered non-impairing.³ No blood specimens were available for toxicology testing.

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. It acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. Ethanol can be produced after death by microbial activity, often in conjunction with other alcohols such as n-propanol.⁴ Extensive trauma increases the spread of bacteria and raises the risk of ethanol production after death.⁵

Diazepam, commonly marketed as Valium, is a sedating benzodiazepine available by prescription as a controlled substance and used to treat anxiety; it is also useful to help treat muscle spasms, alcohol withdrawal, and seizures. It is metabolized to the active metabolites nordiazepam or *temazepam*. These compounds are further metabolized to the active metabolite *oxazepam*. Diazepam and its metabolites carry the warning that they may impair the mental and physical ability to perform hazardous tasks. Drowsiness, fatigue, and muscle weakness are commonly reported side effects. Even low doses can cause confusion, slowed reaction times, and impairment of vigilance and psychomotor and cognitive skills. Diazepam has a half-

² Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

³ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Chlorthalidone. <https://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=342>

Atenolol. <https://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=14>

⁴ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Ethanol.
<http://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=60>

⁵ Kugelberg, FC and AW Jones. 2007. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Science International* 165(1):10-29.

life of 21 to 82 hours; temazepam has a half-life of 3 to 13 hours; and oxazepam has a half-life of 2 to 25 hours.^{6,7,8}

E. SUMMARY OF MEDICAL FACTS

The 52-year-old male pilot held a second class FAA medical certificate without limitation. At his most recent FAA medical certification exam on 11/29/20 he reported no medication use and no medical conditions. According to the autopsy, the pilot's probable cause of death was multiple blunt traumatic injuries from airplane crash (instantly). No brain, heart, or lungs were available for examination.

Toxicology testing detected ethanol in the pilot's muscle tissue at 0.027 grams per hectogram (gm/hg), but not in his liver tissue. N-propanol was detected in his muscle tissue but not in his liver tissue. Tissue samples were described as having undergone putrefaction. Diazepam was detected in the pilot's liver tissue at 12 nanograms per gram (ng/gm), temazepam was detected in liver tissue at 503 ng/gm and muscle tissue at 121 ng/gm, and oxazepam was detected in liver tissue. The generally non-impairing high blood pressure medications chlorthalidone and atenolol were detected in the pilot's liver and muscle tissue.

Submitted by:

Michelle Watters, MD, PhD, MPH
Medical Officer, RE-1

⁶ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Diazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=44>

Temazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=193>

Oxazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=93>

⁷ National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). [DailyMed - DIAZEPAM tablet \(nih.gov\)](#). Updated 10/5/22.

⁸ National Highway Traffic Safety Administration. April 2014. Drugs and Human Performance Fact Sheets. Diazepam [809725-drugshumanperformfs.pdf \(nhtsa.gov\)](#)