

# National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



DCA22PM034

## **MEDICAL**

Specialist's Factual Report

April 20, 2023

## TABLE OF CONTENTS

A. ACCIDENT.....	3
B. MEDICAL SPECIALIST.....	3
C. DETAILS OF THE INVESTIGATION .....	3
1.0 PURPOSE .....	3
2.0 METHODS.....	3
D. FACTUAL INFORMATION.....	4
1.0 USCG CUTTER .....	4
2.0 CENTER-CONSOLE BOAT .....	4
2.1 Surviving Operator .....	4
2.2 Fatally Injured Crewmember.....	4
2.3 Autopsy .....	4
2.4 Toxicology .....	5
2.4.1 ICF Toxicology Results .....	5
2.4.2 FAA Toxicology Results .....	5
2.4.3 Descriptions of Detected Substances .....	5
E. SUMMARY OF MEDICAL FACTS.....	6
1.0 UNITED STATES COAST GUARD CUTTER BRIDGE CREW.....	6
2.0 CENTER-CONSOLE BOAT CREW .....	7

## **A. ACCIDENT**

Location: Vega Baja, Puerto Rico  
Date: August 8, 2022  
Time: About 1:45 pm local time

## **B. MEDICAL SPECIALIST**

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## **C. DETAILS OF THE INVESTIGATION**

### **1.0 Purpose**

This investigation was performed to evaluate the bridge crew of the United States Coast Guard (USCG) Cutter and the crew of the center-console boat for potentially impairing substance use and medical conditions.

### **2.0 Methods**

This medical investigation included all crew members who were on duty on the bridge of the USCG Cutter at the time of the collision, as determined by the National Transportation Safety Board (NTSB) Investigator in Charge (IIC). These crew members were the Commanding Officer (CO), Officer of the Deck (OOD), Boatswain's Mate 1 (BM1), Quartermaster of the Watch (QMOW), and Port Engineer. Each of these crew members underwent post-collision toxicological testing by the Armed Forces Medical Examiner System (AFMES) Division of Forensic Toxicology. For each of the included crew members, the AFMES toxicology report was reviewed. According to the NTSB IIC, none of these crew members underwent a USCG medical evaluation as a result of the collision.

This medical investigation also included both occupants of the center-console boat. The NTSB IIC determined that one occupant (surviving operator) was at the helm at the time of the collision, and that the other occupant (fatally injured crewmember) shared responsibility for operation of the center-console boat. According to the IIC, neither the surviving operator nor the fatally injured crewmember held merchant mariner credentials/medical certification (nor were they required to), and the surviving operator did not undergo post-collision toxicological testing. The surviving operator received medical care at a hospital as a result of the collision; records from this care were reviewed. The deceased crewmember underwent an external autopsy examination with postmortem computed tomography

(CT) imaging and postmortem toxicological testing performed by the medicolegal jurisdiction. The fatally injured crewmember also had postmortem toxicological testing performed by the Federal Aviation Administration (FAA) Forensic Sciences Laboratory, at the request of the NTSB. His autopsy and toxicology reports were reviewed.

Selected investigator reports and relevant regulation and medical literature were also reviewed.

## **D. FACTUAL INFORMATION**

### **1.0 USCG Cutter**

According to the AFMES reports of the USCG bridge crew's post-collision toxicological testing, the CO, OOD, BM1, QMOW, and Port Engineer each had a urine specimen screened for selected drugs of abuse and a blood specimen tested for volatiles (ethanol, methanol, isopropanol, and acetone). No tested-for substances were detected for any of those crew members.<sup>1</sup>

### **2.0 Center-Console Boat**

#### **2.1 Surviving Operator**

According to records from the post-collision medical care of the 39-year-old male operator of the fishing boat, he was treated in the emergency department (ED) and was then discharged. His ED evaluation included basic laboratory testing without toxicological testing. He also underwent imaging including computed tomography imaging (without contrast) of his head, cervical spine, thorax, abdomen, and pelvis to evaluate for injury. No findings of significant natural disease were identified. No significant past medical history was documented.

#### **2.2 Fatally Injured Crewmember**

#### **2.3 Autopsy**

The Institute of Forensic Sciences of Puerto Rico (Instituto de Ciencias Forenses de Puerto Rico, or ICF) performed the 52-year-old male center-console boat crewmember's autopsy. According to the autopsy report, the cause of death was bodily trauma, and the manner of death was accident. The autopsy consisted of an external examination and postmortem CT imaging of the head, neck, chest, abdomen, and pelvis, without a separate internal examination. Within the limitations

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<sup>1</sup> E-mails from the USGC indicated that the collection times of the USCG Cutter bridge crew's tested urine and blood specimens were not specifically documented, but that all specimens were believed to have been collected by 6 PM on the collision date.

of this evaluation, no significant natural disease was identified. Disruption of the abdominal cavity and bilateral diaphragms was noted.

## **2.4 Toxicology**

### **2.4.1 ICF Toxicology Results**

The ICF Forensic Toxicology Laboratory (Laboratorio de Toxicología Forense) performed toxicological testing of postmortem specimens from the fatally injured crewmember.<sup>2</sup> A presumptive positive result was reported for cannabinoids in central blood.<sup>3</sup> Ethanol was not detected in central blood or vitreous.

### **2.4.2 FAA Toxicology Results**

At the request of the NTSB, the FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the fatally injured crewmember of the center-console boat.<sup>4</sup> Ethanol was detected at 0.012 g/dL in cavity blood and was not detected in liver or brain tissue.<sup>5</sup> Delta-9-THC was detected in lung tissue at 17.3 ng/mL and was not detected in cavity blood. Carboxy-delta-9-THC (a metabolite of delta-9-THC) was detected in cavity blood at 2.8 ng/mL. Carboxy-delta-8-THC was reported as "inconclusive" in lung tissue.

### **2.4.3 Descriptions of Detected Substances**

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.<sup>6</sup> However, consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by immersion of a

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<sup>2</sup> According to the ICF toxicology report, vitreous and central blood were screened for volatiles (ethanol, methanol, isopropanol, and acetone). Central blood was also screened for cocaine and its metabolite benzoylecgonine, opiates, and cannabinoids.

<sup>3</sup> This means that one or more cannabinoid drugs/metabolites were detected by a screening immunoassay, without secondary confirmation testing to confirm presence, identity, or level. The ICF toxicology report noted that methodology to perform confirmation testing of cannabinoids was not available.

<sup>4</sup> The FAA Forensic Sciences laboratory has the capability to test for well over 1300 substances including toxins, prescription and over-the-counter medications, and illicit drugs. Some of these substances are listed at <https://jag.cami.jccbi.gov/toxicology>.

<sup>5</sup> According to an e-mail from an FAA Forensic Toxicologist, the FAA Forensic Sciences laboratory uses an ethanol reporting cutoff of 0.01 g/dL.

<sup>6</sup> Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

body in water after death, and can cause an affected toxicological specimen to test positive for ethanol while another specimen from the same person tests negative.<sup>7,8</sup>

Delta-9-THC is the primary psychoactive chemical in marijuana and hashish, which are products derived from the cannabis plant. Delta-9-THC may be smoked or ingested recreationally by users seeking mind-altering effects. It may also be used medicinally to treat illness-associated nausea and appetite loss. Psychoactive effects of THC vary depending on the user, dose, and route of administration, and may impair motor coordination, reaction time, decision making, problem solving, and vigilance.<sup>9,10</sup>

Carboxy-delta-9-THC is a non-psychoactive metabolite of delta-9-THC. Carboxy-delta-8-THC is a non-psychoactive metabolite of delta-8-THC, which is another psychoactive chemical derived from cannabis.<sup>11</sup> Delta-9-THC and delta-8-THC are both among the chemicals in cannabis that are referred to collectively as cannabinoids.

## **E. SUMMARY OF MEDICAL FACTS**

### **1.0 United States Coast Guard Cutter Bridge Crew**

The Commanding Officer, Officer of the Deck, Boatswain's Mate 1, Quartermaster of the Watch, and Port Engineer underwent post-collision toxicological testing by the Armed Forces Medical Examiner System (AFMES) Division of Forensic Toxicology. This testing comprised urine screening for selected drugs of abuse and blood testing for ethanol, methanol, isopropanol, and acetone. No tested-for substances were identified.

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<sup>7</sup> Spitz WU. Forensic aspects of alcohol. In: Spitz WU, Spitz DJ, eds. *Spitz and Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation*. 4th ed. Springfield, IL: Charles C Thomas; 2006:1218-1229.

<sup>8</sup> Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi: 10.1016/j.forsciint.2006.05.004.

<sup>9</sup> Couper FJ, Logan BK. Drugs and Human Performance Fact Sheets. National Highway Traffic Safety Administration. DOT HS 809 725. April 2014 (Revised). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>. Accessed March 24, 2023.

<sup>10</sup> Compton RP. Marijuana-Impaired Driving: A Report to Congress. National Highway Traffic Safety Administration. DOT HS 812 440. July 2017. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>. Accessed March 24, 2023.

<sup>11</sup> United States Food and Drug Administration. 5 Things to know about delta-8 tetrahydrocannabinol - delta-8 THC. Consumer Updates. <https://www.fda.gov/consumers/consumer-updates/5-things-know-about-delta-8-tetrahydrocannabinol-delta-8-thc>. Updated May 4, 2022. Accessed April 12, 2023.

## **2.0 Center-Console Boat Crew**

The 39-year-old male surviving operator of the center-console boat underwent post-collision medical care in a hospital emergency department. His care did not include toxicological testing. His focused emergency department evaluation did not identify any significant medical history or findings of significant natural disease.

The 52-year-old male fatally injured crewmember of the center-console boat underwent an autopsy. According to his autopsy report, his cause of death was bodily trauma, and his manner of death was accident. The autopsy consisted of an external examination and postmortem CT imaging, without a separate internal examination. Within the limitations of this evaluation, no significant natural disease was identified.

Two laboratories performed postmortem toxicological testing of the fatally injured crewmember of the center-console boat. One laboratory detected cannabinoids in central blood and did not detect ethanol in central blood or vitreous. The other laboratory detected ethanol at 0.012 g/dL in cavity blood and did not detect ethanol in liver or brain tissue. That laboratory also detected delta-9-THC in lung tissue at 17.3 ng/mL, did not detect delta-9-THC in cavity blood, detected carboxy-delta-9-THC at 2.8 ng/mL in cavity blood, and reported carboxy-delta-8-THC as "inconclusive" in lung tissue.

Submitted by:

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