



National Transportation Safety Board

Washington, DC 20594

Safety Recommendation

Date: August 26, 2014

In reply refer to: A-14-67 and -68

The Honorable Sally Jewell
Secretary
US Department of the Interior
1849 C Street, NW
Washington, DC 20240

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—railroad, highway, marine, and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the federal government and other organizations to provide assistance to victims and their family members affected by major transportation disasters. The NTSB urges the US Department of the Interior, Bureau of Safety and Environmental Enforcement (BSEE) to take action on the safety recommendations issued in this letter.

These recommendations address occurrences of total or partial loss of engine power on turbine-powered helicopters operating to and from offshore oil platforms in the Gulf of Mexico. The loss of engine power was likely due to inadvertent ingestion of methane gas that was being vented in the vicinity.¹ As a result of the NTSB's investigation of these events, we have issued five safety recommendations, two of which are addressed to the US Department of the Interior. Information supporting these recommendations is discussed below.

On March 24, 2011, about 1655 central daylight time, a Bell 206-L3 helicopter, N32041, operated by PHI, Inc.,² experienced a partial loss of power to its Allison 250-C30 turboshaft engine shortly after takeoff from an offshore oil production platform (MP61A) in the Gulf of Mexico. The commercial pilot initiated an autorotation and activated the helicopter's float

¹ For safety reasons, offshore oil platforms are equipped with booms to perform a controlled release of unburned gases, predominately methane, into the atmosphere (known as venting) or to perform a controlled burn of gas that is a byproduct of routine oil and gas production (known as flaring). Although this letter discusses accidents involving vented methane gas, discharges of other raw gases can also lead to turbine engine failure.

² The operator changed its name from Petroleum Bell Helicopters, Inc. to PHI, Inc. in 2006.

system; the helicopter impacted the water and rolled inverted. The pilot and two passengers received minor injuries, and the helicopter was substantially damaged.³

The pilot and passengers reported hearing a loud bang just after the helicopter departed the platform toward the northwest into the wind. After hearing the bang, the pilot observed a high indication on the torque gauge but did not note any other gauge readings before initiating the autorotation. He stated that when the bang sounded, the helicopter was above and just beyond an “exhaust pipe” on the platform but that he did not know what it vented or whether it was venting when he took off. The production foreman on the platform later reported that the flare boom was venting methane throughout the day, including at the time of the helicopter’s departure. The platform was not equipped to provide any visual indication to pilots when gas was venting. Review of data from the helicopter’s engine data monitoring system revealed a slight increase in the engine torque and turbine outlet temperature readings. Examination of the engine revealed no anomalies that would result in a loss of power. The NTSB determined the probable cause of this accident was “the loss of engine power due to an engine compressor stall as a result of ingesting methane gas during takeoff.”

On August 13, 2013, a Bell 407 helicopter, N53LP, operated by Panther Helicopters, Inc., experienced a total loss of power to its Rolls-Royce 250-C47B turboshaft engine shortly after takeoff from an offshore oil platform (SS208H) in the Gulf of Mexico. The pilot reported hearing a loud bang and attempted to increase the helicopter’s forward airspeed but was unable. He then took mitigating actions once impact with the water was imminent. The pilot and two passengers sustained minor injuries, and the helicopter was substantially damaged.⁴

The NTSB’s investigation of the 2013 accident is ongoing. Preliminary analysis of data from the helicopter’s full authority digital electronic control system indicated an engine surge condition just after takeoff. After about 1 second of the abnormally high engine operating condition, engine power dropped and an engine flameout occurred. Power to the rotor system was regained about 4 seconds later, but there was not sufficient altitude available for the pilot to recover.

The pilot later reported that before departure, he brought the helicopter into a stationary hover in the middle of the helideck and made a “left pedal turn into the wind and in a direction to avoid the flare boom.” According to a monthly gas flaring and venting volume summary provided by the platform operator, the volume of methane vented on the day of the accident was the highest of the month and about 20 times the volume of the second highest day. The pilot was not aware before departing that methane gas was being vented. While a windsock is located on the platform to assist pilots in determining the prevailing wind direction, as recommended in industry guidance, the platform does not have a system visible to pilots indicating when gas is venting; such a system is particularly helpful since methane gas is colorless and odorless and pilots are not able to discern its presence. The following figure shows SS208H with its helideck and flare boom.

³ More information about this accident, NTSB case number CEN11LA252, is available at <http://www.nts.gov/aviationquery/index.aspx>.

⁴ Additional preliminary information about this accident, NTSB case number CEN13FA491, is available at <http://www.nts.gov/aviationquery/index.aspx>.



Figure. SS208H showing the helideck and flare boom.

A brief prepared by the Helicopter Safety Advisory Conference (HSAC) indicates that single-engine, turbine helicopters operating in the Gulf of Mexico primarily service platforms that often have helidecks that were built near flare booms, thereby potentially exposing arriving and departing helicopters to gas discharges.⁵ A sufficiently large concentration of vented combustible gas ingested by a helicopter engine can cause surging, a compressor stall, or flameout.⁶ HSAC Recommended Procedure (RP) No. 92-4, revision 1 dated May 12, 2010, advises that because “gas will drift upwards and downwind of the vent,” pilots should “remain as far away as practicable from the open end of the vent boom.”⁷ Guidance for oil platform supervisors states that “wind socks or [an] indicator should be clearly visible to provide upward indication for the pilot.” It further states that “high volume, large gas vents should have red rotating beacons installed to indicate gas is venting.” This information is echoed in the Federal Aviation Administration (FAA) *Aeronautical Information Manual*.

⁵ HSAC was formed in 1978 to promote improved communication and safe practices within the Gulf offshore community. HSAC consists of representatives from major petroleum oil companies; drilling companies; helicopter operators; oil industry service companies; helicopter manufacturers; all branches of the Armed Forces; and several federal agencies, including the Federal Aviation Administration, the Department of the Interior, and the Customs Service.

⁶ The Civil Aviation Authority, which has oversight of offshore platform operation in the United Kingdom, estimates that concentrations above 10% lower flammable limit (LFL) pose a risk. LFL is the lower end of the concentration range over which a flammable mixture of gas or vapor in air can ignite at a given temperature and pressure.

⁷ HSAC publishes RPs as a “medium for discussion of Gulf of Mexico aviation operational safety, pertinent to the energy exploration and production industry.”

Since the March 2011 accident, PHI and BSEE have issued safety alerts advising of the hazards associated with turbine engine ingestion of venting gas when operating to or from offshore oil platforms. Dated June 2011, PHI's alert to the company's pilots specifically notes that compressor stalls can result and, among other guidance, advises them to "avoid the area downwind of the vent...don't start, takeoff or land if downwind of a venting flare boom." BSEE's safety alert to pilots and helicopter and platform operators, dated May 2014, contains similar advice and reminds recipients to review and adhere to guidance and company policies, repeating the recommended practices listed in HSAC RP No. 92-4.

These actions have primarily focused on increasing awareness of the risks posed to helicopters by raw gas venting during operations near offshore oil platforms. On their own, however, awareness and adherence to some recommended practices are not adequate to prevent an accident. For example, in the August 2013 accident involving the Panther Helicopters Bell 407, the helideck was equipped with a windsock, and the pilot reportedly accounted for the prevailing wind during the attempted departure. However, because methane is colorless and odorless, the pilot had no other method to discern its presence. The NTSB believes this occurrence highlights the need for the identification and development of comprehensive systems and procedures for oil platform operators to mitigate the risk of vented gas ingestion.

Currently, several federal agencies in addition to BSEE regulate various aspects of the oil and natural gas industry in the Gulf of Mexico, but none specifically oversees the safety of helicopter operations to and from offshore oil platforms.⁸ As the agency charged with developing standards and regulations that promote a culture of safety in all offshore activities, BSEE is best positioned to lead in implementing actions that mitigate the risks associated with helicopter operations near methane and other gas releases. While BSEE's recent safety alert is a useful first step to increase helicopter pilot awareness of this issue, the NTSB is concerned that this document has not fully identified the systems and procedures needed to mitigate the recognized risks. In addition, the US Coast Guard regulates the safety of some offshore oil platforms, primarily depending on whether or not the platform is fixed.⁹ Therefore, the NTSB recommends that BSEE, in collaboration with the US Coast Guard, identify and develop comprehensive systems and procedures to mitigate the risk of ingestion of raw gas discharges, such as methane, by helicopters operating in the vicinity of offshore oil platforms. The NTSB also recommends that after appropriate mitigations are developed as recommended in Safety Recommendation A-14-67, BSEE require fixed offshore oil platform operators to implement these systems and procedures.

⁸ In addition to BSEE, these organizations are the US Coast Guard, the FAA, the Environmental Protection Agency, and the Occupational Safety and Health Administration. The FAA, which has regulatory oversight of 14 *Code of Federal Regulations* Part 135 operations, has no regulatory requirement to provide oversight of oil rig helicopter landing platforms.

⁹ Through a 2004 memorandum of agreement between BSEE and the US Coast Guard, BSEE has lead responsibility for helicopter landing and refueling systems on fixed offshore facilities and the Coast Guard has lead responsibility for the same systems on mobile offshore drilling units and other floating offshore facilities.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the US Department of the Interior, Bureau of Safety and Environmental Enforcement:

In collaboration with the US Coast Guard, identify and develop comprehensive systems and procedures to mitigate the risk of ingestion of raw gas discharges, such as methane, by helicopters operating in the vicinity of offshore oil platforms. (A-14-67)

After appropriate mitigations are developed as recommended in Safety Recommendation A-14-67, require fixed offshore oil platform operators to implement these systems and procedures. (A-14-68)

The NTSB also issued two complementary safety recommendations to the US Coast Guard and one safety recommendation to the American Petroleum Institute.

Acting Chairman HART and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations.

The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives. We would appreciate receiving a response from you within 90 days detailing the actions you have taken or intend to take to implement them. When replying, please refer to the safety recommendations by number. We encourage you to submit your response electronically to correspondence@ntsb.gov. If your response exceeds 10 megabytes, including attachments, please e-mail us at the same address for instructions. Please do not submit both an electronic copy and a hard copy of the same response.

[Original Signed]

By: Christopher A. Hart,
Acting Chairman