Advice provided by the C-NLOPB's Offshore Helicopter Safety Inquiry (OHSI) Implementation Team to the C-NLOPB Board

Advising Document

OHSI Phase I, Recommendation 9

Regarding goal-oriented objectives for operational requirements

In November 2010, the Honourable Robert Wells, QC, submitted the Report for Phase I of the OHSI to the C-NLOPB, containing 29 recommendations for enhancing the safety of helicopter travel offshore. Each Advising Document contains the text of the recommendation for which the advice is offered.

The Team's advice for Recommendation 9 was accepted in principle by the C-NLOPB Board at their meeting on June 24, 2011. At that time, the C-NLOPB took responsibility for developing its strategy to implement the recommendation.

The OHSI Reports, other Advising Documents, C-NLOPB OHSI Action Plans, and more can be found on the C-NLOPB website: **http://www.cnlopb.nl.ca/ohsi_main.shtml**

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Recommendation

It is recommended that operational requirements in addition to those of Transport Canada, specifically those relating to items such as operational sea states and visibility, be set by the Regulator as goal-oriented objectives to which the oil operators will respond. Approaches to meeting selected goals should be widely discussed by the Regulator, oil operators, helicopter operator(s), worker representatives, other stakeholders, and experts engaged by any of the parties.

Method

A working group of the OHSI Implementation Team reviewed the recommendation and information provided in the OHSI reports, and conducted research into similar operations in other jurisdictions.

A high-level hazard identification and risk analysis was completed with members of the working group and representatives from the Cougar Search and Rescue (SAR) Team. From the results of the assessment, the group identified the system safety deficiency and developed an implementation plan.

System Safety Deficiency (SSD)

At present there is no consistent application of restrictions on flight operations (due to sea states, meteorological conditions, etc.) beyond those imposed by Transport Canada. A review of the flight planning process was undertaken as part of a general risk assessment and the following system safety deficiency was identified:

Regulatory restrictions on flight operations do not systematically reduce helicopter transportation risk in the C-NL offshore to a level as low as reasonably practicable.

Background

In order to understand the regulatory basis for offshore flight operations, the working group undertook:

- A review of the role of TC;
- A review of Cougar's dispatch process;
- A review of Operators' flight manuals;
- A hazard identification session focusing on helicopter recovery operations post-ditching; and
- A review of common offshore industry practice relating to helicopter operations in other jurisdictions.

The Canadian Aviation Regulations (CARs) govern all civil air activity in Canada. The CARs are enabled by the Aeronautics Act, and both are enforced by TC. The CARs define national minima, and TC expects air operators to supplement their policies and procedures to suit their local circumstances.

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Cougar Helicopters holds all necessary TC approvals to provide a helicopter transport service in compliance with CAR 704, which applies to commercial helicopter transport services.

As a result of the certification, Cougar operates with a number of operational restrictions, including:

- Visual Flight Rules (VFR) minima for take-off, approach and landing;
- Instrument Flight Rules (IFR) minima for take-off, approach and landing;
- Offshore non-precision Non-Directional Beacon (NDB) approaches; and
- IFR precision approaches using Global Positioning System (GPS).

As a continuous improvement initiative, Cougar, with support from the Operators, implemented an airline-style Type-B Co-Authority Flight Dispatch System in July 2007. At the time of approval, it was the first such system employed by a helicopter operator in North America. This system requires that the Pilot-in-Command (PIC) and the Flight Dispatcher jointly share the responsibility for operational control on all Cougar Helicopters' flights. This means both parties must agree on the operational flight plan and all factors that affect it.
Within the system, Flight Dispatchers are routinely tasked to:

- Manage aircraft utilization;
- Continually analyze ongoing and planned flight operations to ensure that they are conducted in weather conditions that respect procedural and aircraft limitations;
- Act as a liaison between Air Traffic Services (ATS) regarding current and planned flight activity;
- Act as a liaison between the Cougar flight crew and Cougar departments such as Maintenance and Passenger Movements;
- Analyze and brief flight crews on current and forecasted weather; and
  Prepare Operational Flight Plans which adhere to requirements established by TC, Cougar and the Operators.

Once the aircraft applies power for the purposes of takeoff, the PIC assumes full responsibility for operational control. The PIC and the Flight Dispatcher then share responsibility for flight watch. In the flight watch role, the Flight Dispatcher is an advisor, and can only suggest changes to the operational flight plan.

Each of the Operators has a Helicopter Operations Manual which outlines Operator-specific criteria for helicopter operations, such as:

- Description of roles and responsibilities;
- Definition of approach and landing limits;
- Passenger and freight handling procedures;
- Flight following procedures;
- Flight planning procedures;
- General Heli-deck operations; and
- Aviation fuel supply guidelines.

There are various international guidelines that have been developed to provide guidance on offshore helicopter transport. In particular, the International Association of Oil and Gas Producers (OGP) have produced detailed guidance for worldwide offshore helicopter transport operations.

In January 2011, a working group of the Implementation Team completed a hazard identification session that validated many of the Inquiry's recommendations.

During the session, the working group identified hazards associated with flight operations offshore, with a specific focus on a controlled ditching on water with recovery by helicopter and supply vessel. The working group identified existing safeguards that mitigate these hazards, gaps in the existing mitigation, and potential methods to address the gaps. Thirty-four performance deficiencies were noted in the following categories:

- BST Training and Fidelity;
- Survival/SAR Equipment and Procedures;
- Pilot training;
- Personnel Physical Fitness;
- Communication of Information;
- Environmental Conditions; and
- Flight Planning.

Of the 34 deficiencies, seven related to environmental conditions and/or flight planning. Examples of deficiencies include ice conditions not being known to pilots, the lack of established weather limits for the safe execution of SAR activities, and the lack of established performance standards for operating limits across the supply vessel fleet.

Appendix A gives an overview of the hazard identification session results.

Discussion

NOTE:

The discussion below applies only to daytime flight operations. Night operations will be addressed in the advising document for Recommendation 12.

As the national regulator for the aviation industry, TC has a holistic view of the aviation industry in Canada, with no particular focus on the C-NL Offshore Area.

Once the requirements of TC have been met, it is the responsibility of the Operators and the helicopter service provider to determine any additional risk mitigation they believe should apply to offshore flight operations. At present in the C-NL Offshore Area, Cougar Helicopters is the only helicopter service provider, and it has independent contracts with each of the producing Operators.

The producing Operators have chosen to "pool" their aircraft to ensure continuation of passenger movement service to all installations in the event of aircraft unavailability or prolonged periods of backlog, and to ensure efficient payload utilization. While pooling has been generally positive in terms of efficient passenger movement, the Operators pooling principles do not address issues relating to flight safety.

There is no common helicopter operations manual that is used in the C-NL Offshore Area. As each Operator acts independently, there have been situations where flight operations in the same region,

using the same aircraft, were undertaken using different flight restrictions. An example of this is the case of sea state restrictions, which, until the release of the TSB report on Flight 491, varied amongst the Operators.

When making decisions regarding flight operations, the offshore management team considers the availability and suitability of the standby vessel to conduct rescue operations if there is an event near the installation. Each of the standby vessels employed in the CN-L Offshore Area is compliant with TC's TP 7920 ("Standards Respecting Standby Vessels") and, as such, is capable of seaborne rescue. Each vessel must meet the requirements of TP 7920 — which has been in place since 1988 — as they pertain to the standby mode in support of offshore drilling and production operations. In addition to the requirements previously mentioned, TC has also published TP 4414 ("Guidelines Respecting Helicopter Facilities on Ships"), which provides guidance on:

- Helicopter decks and winching areas;
- Helicopter fuelling and servicing facilities;
- Fire-protection and personnel-rescue facilities; and
- Helicopter operations in general.

Section 22 (8) of TP 4414 states that:

> Before authorizing takeoff and landing operations, the ship's Master or Person having Command should ascertain that: … (b) a rescue craft has been readied and is capable of immediate launching in the event that the helicopter or any person lands in the water.

In the event of a ditching, or any other event that leads to an aircraft landing on the water, the sea conditions may affect the chances of survival of the passengers and crew by:

- Contributing to a hard landing which may result in injury;
- Causing the aircraft to invert or sink rapidly;
- Making it difficult or impossible for persons to board life rafts; or
- Slowing air and seaborne search and rescue efforts.

It is not apparent to the Team that operational limitations in addition to those of TC relating to visibility are required to reduce the helicopter transportation risk.

The expert panel that was convened to conduct the Operational Safety Risk Assessment (OSRA) on the subject of night flight (Recommendation 12) stated that reduced visibilities can be managed by the employment of competent crews to operate suitably equipped aircraft, using, as required, IFR procedures, collision avoidance systems, and by adhering to prescribed offshore approach limits.

Conclusion

The Team believes there is need to develop performance requirements relating to the dispatch of helicopters in the C-NL offshore. The areas requiring performance requirements are outlined in Appendix B. These requirements should be developed by the C-NLOPB with input from the flight service provider and the Helicopter Operations and Safety Committee (HOSC) (as described in the Advising Document for Recommendation 20).

In addition to the performance requirements in Appendix B, the Team advises the C-NLOPB to consider the recommendations listed below.

Recommendations

It is recommended that the Team's "Guidance for Performance Requirements for Helicopter Dispatch in the C-NL Offshore Area" (Appendix B) be adopted by the C-NLOPB and reviewed and revised to aid in its development of goal-oriented objectives to meet the intent of the Inquiry recommendation.

- The Team recommends that the C-NLOPB require Operators to regularly demonstrate the SAR capability of standby vessels.
- The Team recommends that the C-NLOPB, in consultation with the Operators, define rescue equipment fitment standards for offshore standby vessels (FRC, DACON, PLB direction finders, etc.) that may be tasked to conduct rescue operations.

NOTE

TP7920E is the TC standard to which standby vessels are certified. This standard was adopted in 1988 and may not reflect the current capabilities of the vessels employed in the C-NL Offshore Area or the technological advancements in seaborne SAR that are commercially available.

- The Team recommends that R&D activity be undertaken to improve the accuracy of offshore weather forecasting, with specific emphasis on improving the accuracy of predicting enroute sea state, freezing precipitation, and visibility at the offshore location.

Appendix A

Helicopter Operations Hazard Identification and Gap Analysis

One aspect of the response to the recommendations from the Inquiry was a hazard identification (HAZID) and gap analysis session to identify hazards associated with current practices for flight operations offshore. The session identified existing safeguards in place which mitigate these hazards, and as well identified the current gaps (deficiencies) that exist and potential methods to address such gaps. The identified system deficiencies have helped the Team to develop performance-based goals.

Participants included a working group of the Implementation Team, the C-NLOPB Aviation Advisor, Cougar's SAR Lead Pilot, and Cougar's Team Lead Rescue Specialist.

In order to reduce the risk associated with helicopter transport, either one or both of the following must occur:

1. Further reduce the likelihood of ditching; and/or
2. Further improve the likelihood of survival.

The focus of the HAZID was on Item 2, above. In order to improve the likelihood of survival, the following conditions would need to be met:

1. Helicopter remains upright;
2. Passengers successfully egress the helicopter;
3. Passengers survive the present environmental conditions; and
4. Passengers are recovered by First Responders (i.e. helicopter or supply vessel) in a timely manner.

It was noted during the session that several factors would need to align in order for an aircraft to remain upright. Therefore, the focus of the discussion was on items two through four above. The bulk of the discussion and findings were related to the successful egress of the helicopter and that personnel survive the harsh environmental conditions until First Response arrive.

The focus of the HAZID was on planned ditching on water and was broken into three categories:

1. General hazards associated with Ditching;
2. Recovery via Helicopter; and
3. Recovery via Supply Vessel.

34 deficiencies were noted over the three sessions. If the identified gaps in training are addressed, it would increase personnel familiarity with a wider range of scenarios and likely increase the likelihood of a successful egress from a ditched aircraft.

Seven of the identified deficiencies relate to environmental conditions and/or flight planning. These deficiencies are highlighted in the chart on the following page.

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#	System Deficiency	Communication	Information	Training/Familiarity	Flight Planning	Passenger Physcial Condition	Environmental Conditions	Survival/SAR Equipment/Procedure
1	Bluesky information is not readily available to pilot while in flight. In the event of an emergency, pilots could avail of knowing the location of supply vessels for decreased time for recovery in the event of a ditch.	X	X					
2	Pilots do not currently have specific command and control training for ditching/egress scenarios.			X				
3	Pilots are currently not cross-trained with the BST training that is provided to passengers and are not aware of the expected passenger actions upon egressing. This may limit the Pilot's ability to effectively take command once the aircraft has landed on the water surface			X				
4	In discussions regarding visibility of passengers, it was noted that keeping the liferafts attached to an upright and stable aircraft (if sea states permit) would increase the visibility of the liferaft to the SAR team and would also allow access to additional medical supplies from the aircraft if the supplies diminish in the liferaft. It was also noted that if the liferaft remains attached that one person should be assigned to keep watch of the aircraft and cut the painter immediately if there is any indication that the aircraft starts to roll or sink.		X	X				
5	Pilots do not know if the aircraft isn't being tracked unless notified by Cougar Flight Following or Installation CCR Operator. There is no way to know the precise location of the aircraft if Bluesky malfunctions. Consider the use of AIS for helicopter operations	X	X					
6	BST training currently does not train with removing windows underwater.			X				
7	HUET training does not include the use of HUEBA while exiting the HUET (including while inverted). Passengers are unfamiliar with the ease/difficulty required to remove window once submerged.			X				
8	BST HUET training does not use egress from inverted aircraft with the floatation inflated. This could cause confusion with personnel as the ascend to the surface of the water.			X				
9	All stakeholders are not engaged when developing BST training curriculums.	X		X				
10	HUET training does not include escape with the presence of Auxiliary tanks in the cabin. There is uncertainty with respect to the particular height or size of person that may have difficulty in reaching over the Auxiliary tank to remove the escape window. This could be a consideration for assigned seating scenarios.			X	X	X		
11	HUET training does not cover the stroking of seats that would occur upon impact with the water.			X				
12	BST does not give awareness of the potential debris that could be present when egressing aircraft from underwater (e.g. aircraft debris, ice, etc). Awareness is only given to debris that could be on the surface of the water when egressing from an aircraft that remains afloat.			X			X	
13	HUET training does not give guidance on time spent trying to open assigned exit and when to relocate to an alternate exit.			X				
14	Pilot simulator training is limited in scenarios involving landing in reduced visibility.			X				
15	If there is a mechanical problem with the aircraft, passengers might not be able to hear the pilot announcement to prepare for ditching. Alternate communication/notification could allow more reaction time for the Pilot and passengers to prepare.	X						
16	Current ice conditions are not known to the pilots. Pre flight updates should include current ice status.	X	X				X	
17	HUET training provided in NL does not prepare tandem person for exit after person next to window exits.			X				
18	Personnel size is not considered in seating arrangements.				X	X		
19	Escape through window not considered in medical clearance to work offshore.					X		
20	BST training uses immersion suit vs. flight suit on sea day.			X				
21	There is currently no training for cold water shock.			X		X		
22	There is no personal accountability for personnel undergarments.					X		
23	HUEBA training should clarify use of HUEBA for breathing in presence of heavy smoke.			X				
24	Pilot suits are different from the passenger flight suits (colour, no CBSG design standard, no D-Link on suits), etc.					X		X
25	BST training does not train for scenarios in decreased lighting scenarios.			X				
26	Limited aids for pilots to conduct ditching at night.		X					X
27	Commercial flight planning considers weather window to allow enough time to fly to installations and return prior to forecasted weather deteriorating but do not consider SAR response time that would be required in the event of a ditching.				X			
28	Formal communication protocol between Cougar and DND is not yet established. Refer to Inquiry Recommendation 4.	X						
29	There are no established weather limits with respect to wind and sea states for the safe execution of SAR activities on site by SAR air craft (If weather limits allow the SAR aircraft to launch) or by Supply Vessel.						X	X
30	There are no two-way radios currently in the aircraft liferafts to allow communication between SAR team and liferaft.	X						X
31	Auto-hover certification is outstanding.							X
32	TP 7920E does not mandate use of the SAR equipment (PLB direction finders, Dacon scoops, etc.) on FRCs and Standby vessels.							X
33	There are no drills or other training for FRC operations at night.			X				
34	There are no established performance standards for operating limits across supply vessel fleet.						X	X

Appendix B

Guidance for Performance Requirements for Helicopter Dispatch in the C-NL Offshore Area

- The flight service provider, in passenger flight planning, shall ensure that flights do not occur over ocean conditions which exceed the aircraft's flotation design capability.
- The Operator, in its flight approval process, shall ensure that flights do not occur over ocean conditions which exceed the capability of the standby vessel to effect timely rescue operations.
- The flight service provider, in passenger flight planning, shall consider the dispatch capability of the First Response aircraft to effect SAR activity in observed and predicted conditions along the flight path.
- The flight service provider shall develop a process to educate all aircrew on the offshore operating environment including information such as:
    - Local weather phenomena in the operating area;
    - Surface vessel response capability and location; and
    - Installation overviews, with specific emphasis on factors affecting flight operations.
- The flight service provider, in conjunction with the Operators, shall develop guidance for the conduct of flight operations over sea ice conditions, which are commonly present in the C-NL Offshore Area.