IN THE MATTER OF the Commission of Inquiry into matters respecting Helicopter Passenger Safety for Workers in the Newfoundland and Labrador Offshore Area established pursuant to s. 165 of the Federal Accord Act (s. 161 of the Provincial Act) by order dated May 25, 2009

## WRITTEN SUBMISSION – PHASE II ON BEHALF OF THE ESTATES AND FAMILIES OF THE FLIGHT CREW OF COUGAR HELICOPTER SIKORSKY S92-A FLIGHT 491

BY: KATE O'BRIEN O'BRIEN & ANTHONY Counsel for the Estates and

Counsel for the Estates and Families of Matthew Davis and Timothy Lanouette (as agent).

279 Duckworth Street St. John's, NL A1C 1G9

## TO: COMMISSIONER ROBERT WELLS, Q.C. OFFSHORE HELICOPTER SAFETY INQUIRY

Suite 213, 31 Peet Street St. John's, NL A1B 3M7

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## 1.0 Introduction

This submission is made on behalf of the Estates and Families of Matthew Davis and Timothy Lanouette (as agent), pilots of Cougar Helicopter Sikorsky S92-A flight 491, in response to the Commissioner's invitation to make submissions as to what recommendations he should consider making under the following clauses of the Terms of Reference for the Offshore Helicopter Safety Inquiry:

Phase II

Upon completion of the Transportation Safety Board of Canada Investigation into Cougar Helicopter Sikorsky S92-A Crash, the Commissioner shall undertake a review of the sections of the Report therefrom that deal with matters which are specifically within the mandate of the C-NLOPB and particularly the findings in respect thereof and shall advise the C-NLOPB:

- (a) which findings should result in actions being recommended to be undertaken by C-NLOPB and how they should be implemented,
- (b) which findings should result in actions being recommended to be undertaken by other legislative or regulatory agencies.

The Commissioner may retain and as needed request the services of independent specialists whose function would be to provide information on and interpret information and issues relevant to the Inquiry. Independent specialists retained by the Commissioner may be requested by the Commissioner to appear before the Commissioner as experts.

This submission will focus on the following findings of the Transportation Safety Board, numbered as they appear in *section 3.2 Findings as to Risk* in Aviation Investigation Report A09A0016:

#### **Regarding Basic Survival Training:**

- 14. The current basic survival training (BST) standards in Canada lack clearly defined, realistic training standards and equipment requirements. This could lead to differences in the quality of training and affect occupant survivability.
- 15. An interval of 3 years between recurrent BST may result in an unacceptable amount of skill decay between recurrent training sessions. This skill decay could reduce the probability of successful egress from a submerged helicopter.

## **Regarding Flight Crew Suits:**

- 17. There are minimal regulations and standards pertaining to offshore helicopter flight crew suit use and maintenance. This increases the risk that flight crews will be inadequately protected following a ditching or crash at sea.
- 18. Offshore helicopter flight crew suits that are not a high visibility colour reduce the probability of detection by search and rescue crews following a ditching or crash at sea. This could significantly delay rescue at night or in bad visibility.

#### **Regarding Helmets and Visors:**

22. The lack of regulation requiring pilots to wear helmets and visors places them at greater risk of incapacitation due to head injuries following a ditching or crash. This type of injury jeopardizes a pilot's ability to assist in the safe evacuation and survival of the passengers.

## 2.0 TSB's Findings and the Role of the CNLOPB Generally

A number of the TSB's findings relate to pilot training and flight procedures that are not particular to the Newfoundland and Labrador Offshore operating environment. Nonetheless, deficiencies in these areas will directly affect the safety of our offshore workers. We do not expect the Commissioner to make direct recommendations on issues such as Crew Resource Management (**CRM**) trading and malfunction procedures and the like, however, we feel these TSB findings merit some general consideration.

In his Phase I Report at Volume 1, Chapter 8 the Commissioner made observations on the role of the C-NLOPB in helicopter safety:

C-NLOPB does not appear to have had a strong engagement in helicopter operations. It has never had aviation or helicopter experts on staff or under consulting contract, and I believe that is still so.

The oil operators, who have access to expertise, presented helicopter operations contracts for review by C-NLOPB. As Regulator, CNLOPB could demand changes to the proposed contract or contracts, but I do not think it was equipped, or required to be equipped, with the expertise to make it a major force in the regulation of helicopter operations. Furthermore, I am not aware that an organized forum exists, even today, whereby workers or other stakeholders can have direct input, nor have I been told that any safety information vis-à-vis the helicopter contracts has ever been made public on a regular basis.

After contracts were signed and became operative, C-NLOPB conducted audits of the helicopter operator to ensure that it was complying with the contract, but audits do not really address the crucial aspects of what should or ought to have been included in such a contract. Furthermore, in the Canadian context it would be easy to conclude that offshore aviation, which falls under the jurisdiction of Transport Canada, is covered in all its aspects by federal regulation.

Transport Canada does regulate crucial aspects of offshore helicopter operation, but there are areas of helicopter offshore safety which it does not regulate. It is also important to note that some important regulated areas can be and, in some cases, are addressed by additional requirements which exceed those of Transport Canada. That should not come as a surprise to anyone because, as I have often said in this Report, the C-NL offshore environment is for a variety of reasons probably the harshest in the offshore world, especially where helicopter flight and rescue operations are concerned. These observations by the Commissioner underpinned a number of his recommendations, particularly those on Regulatory Oversight. We wholeheartedly support these recommendations. We also acknowledge and support the C-NLOPB's response to the recommendations to date which have included creating an Aviation Team lead by an experienced Aviation Safety Advisor.

Throughout the course of the Inquiry, we have urged the importance of the C-NLOPB seeing beyond the boundary of what might at first be perceived as the sphere of Transport Canada. There is no doubt that Transport Canada is the primary regulator but, as recognized by the Commissioner in the passages quoted above, there will be areas of offshore helicopter safety which it does not regulate and there will also be areas where additional requirements exceeding those of Transport Canada will be needed. Through its oversight of the helicopter service provider contracts, the C-NLOPB has the ability to require top-tier training for pilots, frequent review of rotocraft flight manuals (**RFMs**), standard operating procedures, checklists and the like and a number of other recommendations directly related to the TSB's findings.

To give a specific example, the TSB found that a lack of recent, modern, CRM training likely contributed to communications and decision-makings breakdowns with the flight crew of flight 491. As a result, TSB *Findings as to Risk* numbers 12 and 13 directly concern deficiencies in the current Transport Canada regulations around CRM. The C-NLOPB could require that helicopter service providers to our offshore installations be contractually required to have latest generation CRM training and frequent recurrent training.

The pilots who fly in the Newfoundland and Labrador offshore fly over one of the harshest marine environments in the world. If something goes wrong, as it did for Matt Davis and Timothy Lanouette, the pressure on the pilots cannot be overstated. These pilots deserve the best training possible; they deserve to have up-to-date, unambiguous RFMs and emergency procedures. The passengers of the helicopters deserve it too. The C-NLOPB has a role to play in ensuring that this happens and we ask the Commissioner to consider that role in his recommendations with respect to the TSB findings generally.

## 3.0 TSB Findings Regarding Basic Survival Training

TSB findings 14 and 15, reproduced below for convenience, relate directly to the Commissioner's recommendation number 13, also reproduced below.

## TSB:

14. The current basic survival training (BST) standards in Canada lack clearly defined, realistic training standards and equipment requirements. This could lead to differences in the quality of training and affect occupant survivability.

15. An interval of 3 years between recurrent BST may result in an unacceptable amount of skill decay between recurrent training sessions. This skill decay could reduce the probability of successful egress from a submerged helicopter.

#### **Commissioner Wells:**

13. It is recommended that safety-training goals be established by the Regulator in consultation with suppliers of personal protective equipment, trainers, oil operators, and worker representatives. HUET [helicopter underwater escape training] and HUEBA [helicopter underwater emergency breathing apparatus] training are necessary, but should not be so rigorous as to pose safety risks. Training should be done with greater fidelity, which objective is already being pursued. Fidelity should encompass survival training in more realistic sea conditions than is currently the case. The Regulator, oil operators, worker representatives, and, as appropriate, other stakeholders should be involved in the discussions as to how training goals should be met.

Our submissions on these survival training recommendations are simply that any consideration of the training requirements should include a distinct consideration of the pilots' survival training. While there may be considerable overlap between the needs of the pilots and the passengers, there may also be instances where the pilots' requirements differ. Fidelity in training is no less important for flight crew and so, whenever possible, the HUET, breathing apparatus training, and other survival training for pilots should mimic their actual equipment and conditions including, suits worn, breathing apparatuses used and cockpit environment.

#### 4.0 TSB Findings Regarding Flight Crew Suits:

TSB findings 17 and 18, reproduced below for convenience, relate directly to the Commissioner's recommendation number 16, also reproduced below.

## TSB:

- 17. There are minimal regulations and standards pertaining to offshore helicopter flight crew suit use and maintenance. This increases the risk that flight crews will be inadequately protected following a ditching or crash at sea.
- 18. Offshore helicopter flight crew suits that are not a high visibility colour reduce the probability of detection by search and rescue crews following a ditching or crash at sea. This could significantly delay rescue at night or in bad visibility.

#### **Commissioner Wells:**

16. It is recommended that, before the Regulator establishes goals for the oil operators, the need for additional personal protective equipment for pilots and passengers be studied and discussed by Transport Canada (with their agreement), the Regulator, oil operators, helicopter operator(s), trainers, manufacturers and suppliers of personal protective equipment, and worker representatives.

Our submissions on this topic may somewhat repeat our submissions on Phase I, however, we believe that the deficiencies in the current regulatory regime and the absolute lack of data with respect to pilot suits used in the Newfoundland and Labrador offshore are such that repetition is warranted.

The findings of the TSB and the recommendations of the Commissioner are supportive of each other but they do not align exactly.

The TSB has identified three issues pertaining to flight crew suits:

- 1. The lack of standards and regulations for flight crew use increases the risk to pilots of inadequate protection;
- 2. The lack of standards and regulations for flight crew maintenance increases the risk to pilots of inadequate protection; and
- 3. The use of flight crew suits that are not a high visibility colour reduces the probability of detection in ocean waters by search and rescue crews.

The Commissioner has identified one issue pertaining to flight crew suits:

1. Further study and discussion by Transport Canada, C-NLOPB, oil operators, helicopter operator(s), trainers, manufacturers and suppliers of personal protective equipment, and worker representatives is needed before the C-NLOPB establishes goals for the oil operators, for additional personal protective equipment.

We strongly support the Commissioner's recommendation for further study and work and see it as a critical first step to addressing the concerns raised by the TSB. It is only a first step, though, as ultimately, a standard is needed and the Canadian General Standards Board (**CGSB**) has to be engaged. Even without a standard in place we see a role for the C-NLOPB to be proactive and require that the helicopter operators have empirical data to support their choice of suit and robust maintenance procedures in place. Our thoughts on these matters will be expanded on below.

## The Lack of Standard for Pilot Suits

CGSB has published detailed and comprehensive standards for Immersion Suits (CAN/CGSB 65.16- 2005) and Helicopter Passenger Transportation Suits (CAN/CGSB 65.17-99). Currently a Working Group has been established within the CGSB to review these standards and, according to the summary of a meeting between representatives of this Working Group and Inquiry Counsel published in the Phase I Report at Volume 3, page 479, a new standard is expected in the spring of 2011. It seems, though, that this is only a first step; as noted by the Commissioner in his Phase I Report at Volume 1, Chapter 7, page 235:

In the September 8 and 9, 2010 hearings, I heard for the first time that the Working Group is now considering the development of a suit purposely designed for the C-NL offshore. That is a concept which has been in my mind for months and which I mentioned at a previous hearing.

So, for passenger suits we have: (1) a current standard; (2) a forthcoming revised standard; and (3) consideration being given to a further standard specific to our offshore conditions. Conversely, there are <u>no</u> regulatory initiatives in place for pilots' suits. According to the TSB report at page 42: "*There are no current standards for flight crew immersions suits and no current requirement in the CARs for flight crew to wear them.*" According to Rick Burt of Cougar in his testimony at the Inquiry, the only mandate for flight suits is Transport Canada's requirement that the suits provide "*suitable protection against hypothermia*".

It does not have to be this way, nor should it. The attention given to passenger suits over that given to flight crew suits is short-sighted given that in terms of flight-hours, pilots face the greatest risk.

The unique circumstances of flight crew have not stopped European regulators from developing standards. As noted at page 42 of the TSB report:

In contrast [to the Canadian situation], EASA [European Aviation Safety Agency] explicitly states that its immersion suit design standards apply to both crew and passengers. In 2006, EASA published the following standards:

- 1. European Technical Standard Order (ETSO-2C502) Helicopter Crew and Passenger Integrated Immersion Suits; and
- 2. European Technical Standard Order (ETSO-2C503) Helicopter Crew and Passenger Immersion Suits for Operations to or from Helidecks Located in a Hostile Sea Area.

## The Lack of Maintenance Standards

This issue, identified by the TSB, did not come to the fore during the inquiry. As such, some background taken from the TSB report at page 43 is helpful:

Suit manufacturers provide recommended care and maintenance guidelines for crew suits and ancillary lifesaving equipment such as flotation vests. Although, there is no regulation outlining care and maintenance requirements for immersion suits, CARs Standard 625 Appendix C Item 11 states, "survival and emergency equipment shall be overhauled at the intervals recommended by the manufacturer." At the time of the occurrence, a formal pilot immersion suit maintenance program with scheduled inspections was not in place at Cougar Helicopters and crew were expected to inspect their own suits. After the accident, an inspection of the pilot immersion suits revealed that 16 out of 25 crew suits were unserviceable, with 5 of those requiring major repairs. It was determined that some pilots were not completing thorough suit inspections and some of the unserviceable issues would not have been easily detected by a cursory visual inspection.

Since the accident, Cougar has taken corrective action as noted at page 142 of the TSB report:

Cougar Helicopters implemented a Lifesaving Equipment Tracking System (LETS). The LETS tracks scheduled and completed maintenance for pilot and rescue specialist flotation vests, pilot and rescue specialist suits, helmets and personal locator beacons.

We submit that the C-NLOPB should ensure that Helicopter Operators are contractually required to:

- Educate their employees about the survival and emergency equipment they use, including its proper care and maintenance; and
- Have regularly scheduled inspections and maintenance of such equipment.

As noted by the Commissioner in the quotes above, if C-NLOPB audits of the helicopter operator will not reveal deficiencies on items that are not included in the contracts.

## **High Visibility Colour Suits**

The visibility of pilot suits is clearly a safety issue for which there is currently no consensus in the industry. The TSB, experts in their field, have included in their findings that the blue colour suits currently used by Cougar pilots reduces the probability of detection in ocean waters by search and rescue crews. This is a serious concern given that all but a small percentage of their flying time is over water.

In the TSB report at page 41, background information is given which helps clarify the lack of consensus:

Blue is the only color available in this model [used by Cougar pilots]. There are other pilot immersion suits commercially available with international orange or yellow exteriors which have been identified as playing a beneficial role in SAR recovery activities.<sup>44</sup> However, there is not universal acceptance of these types of suits because of the potential for reflections in the cockpit which may distract the pilots. European Technical Standard Order (ETSO)-2C503 - *Helicopter crew and passenger immersion suits*, Appendix 1, states that where possible flight crew immersion suits shall meet the same requirements as those for passenger suits, which require that those parts of the suit which will be visible when in the water shall be of a highly conspicuous colour. ETSO-2C503 further states that "the choice of suit colour may vary to minimize the risk of the suit reflecting on surfaces within the flight deck." As a result, some operators opt for pilot immersion suits that are not of a highly visible colour to reduce the potential for distractions caused by reflections off cockpit surfaces.

<sup>44</sup> In the AAIB's investigation report (No: 7/2008) of an Aerospatiale SA365N, G-BLUN, the AAIB identified the advantages of high visibility colour immersion suits and recommended (2008-036) that EASA investigate methods to increase the conspicuity of immersion suits worn by the flight crew, in order to improve the location of incapacitated survivors of a helicopter ditching.

The issue of suit colour was canvassed by two experts retained by the Inquiry. At page 42 of his expert report to the Commissioner, Michael Taber wrote:

For example, in a safety recommendation from the Australian Aviation Investigation Bureau (AAIB) (2008), it is recommended "that the European Aviation Safety Agency (EASA) investigate methods to increase the conspicuity of immersion suits worn by the flight crew, in order to improve the location of incapacitated survivors of a helicopter ditching. The yellow immersion suits worn by the passengers were noticeably more conspicuous in the dark than the blue immersion suits worn by the pilots when illuminated by a helicopter's searchlight" (Safety Recommendation 2008-036 AAIB). And the CAA suggests, "the choice of suit colour may vary to minimize the risk of the suit reflecting on surfaces within the flight deck" (p. 4).

In her testimony, Dr. Coleshaw commented on a recent report from the Accident Investigation Branch in the United Kingdom on a crash in the Irish Sea where it was noted that it was much easier to spot the passengers in the yellow suits than the pilots in their dark suits. She considered suit visibility to be a "major issue".

The colour issue was also canvassed with Captain Jakobus Johannes Gerber, Director of Flight Operations with Cougar, during his testimony. He confirmed that the navy suits were used to reduce reflection in the cockpit. He felt that the loss of visibility from the suits was adequately compensated for by other measures: safety systems to prevent ditching and crashing into water, reflector tape on the life vests, reflector tape on the suits and personal locator beacons.

Now that the TSB has advised us of their concern, we request that the Commissioner review the matter again and consider making a more specific recommendation. We do not expect the Commissioner to make a specific recommendation as to suit colour, but we believe that the mitigating measures described by Captain Gerber need to be formally assessed to ensure that they are enough to make the risk of not being seen in the water as low as practicably possible. An assessment of the Cougar flight suit against the EASA standard would be informative and a good starting point. In any event, a lack of a Canadian flight crew suit standard is not justification for no assessment of the suits at all.

## The Need for Further Study and Discussion by Stakeholders

We wholeheartedly support the Commissioner's recommendation for further study and discussion amongst the stakeholders. The need for further study and cooperative work underlies all of our submissions on flight suits above.

Separate and apart from the need for such work to advance the regulatory deficiency, we would like to reiterate our Phase I submission that testing needs to be done as soon as possible to quantify the thermal protection Cougar pilots are getting from their suits. Currently, we have no data to indicate how these suits will perform in our offshore conditions.

The TSB's comments on the thermal protection of the Cougar flight crew suits at page 44 of its report are as follows:

Both occurrence pilots were wearing blue Viking pilot suits (Viking Life-Saving Equipment; model number PS4177). The Viking PS4177 is a dry-suit with neoprene wrist seals, a waterproof zip fastener, and a neoprene collar and hood. There is no inherent buoyancy provided by the Viking PS4177 nor does it provide thermal protection. Buoyancy is provided by a separate flotation vest and thermal protection is provided by undergarments. [emphasis added]

Testing has been done on the passenger suits as it is required for the CGSB standard. In addition to that testing, the Canadian Association of Petroleum Producers (**CAPP**) recently funded the CORD Group to do further, more stringent testing on the passenger suits. The CORD Group test conditions were for longer periods of time than the CGSB testing and in more realistic, wave water conditions.

Again, compare this to the current situation for the flight crew suits for which no testing has been done. Do they protect against hypothermia in the North Atlantic? We don't know. We have no data before us to help predict how these suits will work once immersed in frigid, rough water conditions. We remind the Commission that during the Inquiry, Cougar provided information on its suits, but it was largely a qualitative description of the suits without any quantification of thermal rating, water ingress rate, or buoyancy specifications. This data is critical for any risk assessment of the flight suits.

In his report for the Inquiry, Michael Taber cited research by Brooks (Transport Canada, 2003), that air crew should be thermally protected by a suit ranging from 0.25 to 0.75 Clo. One would reasonably infer that in the frigid waters off our coast, a Clo rating to the high end of this range would be best. We know from the information provided by DND that their SAR helicopter pilots working in the Newfoundland Offshore area wear a dry suit with an immersed Clo of 0.847 plus a liner made of Nomex and closed cell PVC foam. It would be interesting to know how this suit rates in comparison to the suit used by Cougar. Unfortunately, we don't know because no testing has been done and no specifications have been provided.

From the research that was presented to the Commissioner by Michael Taber, we know that water ingress to a suit has a drastic effect on a body's ability to stave off hypothermia in cold water conditions. Again, no water ingress testing has been done on the flight crew suits, thus we do not know how they will perform when exposed to rough water.

## 5.0 Helmets

TSB finding 22, reproduced below for convenience, relates directly to the Commissioner's recommendation number 15, also reproduced below.

#### TSB:

22. The lack of regulation requiring pilots to wear helmets and visors places them at greater risk of incapacitation due to head injuries following a ditching or crash. This type of injury jeopardizes a pilot's ability to assist in the safe evacuation and survival of the passengers.

#### **Commissioner:**

15. It is recommended that the wearing of pilot helmets be made compulsory.

We wish to thank the Commissioner for this recommendation. We were pleased to see his recommendation echoed by the TSB. If accepted by the C-NLOPB, we believe it will do much to enhance pilot and passenger safety in the Newfoundland and Labrador offshore. Without this protection the risk of a pilot becoming incapacitated from head injury is greatly increased and an injured pilot is not only less able to help himself, he is unable to guide and assist his passengers.

#### 6.0 Conclusion

We thank the Commissioner for inviting us to make this submission for Phase II. We look forward to receiving his recommendations in relation to the TSB findings.

We also thank the Commissioner, Inquiry Counsel and staff for the hard and serious work they have done. Thanks to their efforts, and the efforts of the many others who participated in this Inquiry, we are optimistic that good will come from the immeasurable sorrow of March 12, 2009.

All of which is respectfully submitted this 15th day of April, 2011.

Kate O'Brien O'Brien & Anthony 279 Duckworth Street St. John's, NL A1C 1G9