Final Report

Return to Night Passenger Transport Operations

Provided to the

CANADA-NEWFOUNDLAND AND LABRADOR OFFSHORE PETROLEUM BOARD (C-NLOPB)

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Abbreviations

ALARP	As Low As Reasonably Practicable
AFCS	Automatic Flight Control System
C-NLOPB	Canada Newfoundland and Labrador Offshore Petroleum Board
CRM	Crew Resource Management
CRT	Cathode Ray Tube
CPT	Cockpit Procedures Trainer
DND	Department of National Defence
ECL	Engine Condition Levers
FAA	Federal Aviation Administration
FOIMS	Flight Operations Information Management System
FTD	Flight Training Device
FFS	Full Flight Simulator
FLIR	Forward Looking Infra-Red
FMP	Fatigue Management Plan
FOV	Field of View
FPSO	Floating Production Storage and Offloading
FSI	Flight Safety International
G/S	Ground Speed
HEMS	Helicopter Emergency Medical Service
HOTF	Helicopter Operations Task Force
HUD	Heads Up Display
HUMS	Health Usage Monitoring System
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
KPI	Key Performance Indicator
IMC	Instrument Meteorological Conditions
NVG	Night Vision Goggle
OHSI	Offshore Helicopter Safety Inquiry
PM	Project Management
RA	Risk Assessment
RAM	Risk Assessment Matrix
RCC	Rescue Coordination Centre
RFM	Rotorcraft Flight Manual
SAR	Search and Rescue
SMS	Safety Management System
SOP	Standard Operating Procedure
TC	Transport Canada
VDB	Visual Data Base
WBS	Work Breakdown Structure

References

1. Canada-Newfoundland and Labrador Offshore Helicopter Safety Inquiry, Volume 1 – Report and Recommendations, by The Honourable Robert Wells, Q.C., October 2010.
2. Report of the Public Review Commission for the Hebron Development Application, by Mr. Miller Ayre, February 2012.
3. Operational Safety Risk Analysis (OSRA) of Night Helicopter Transport Operations In the C-NL Offshore Area, Produced by SMS Aviation Safety, On behalf of The C-NLOPB Offshore Helicopter Safety Inquiry Implementation Team, November 2011.
4. Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012.
5. Resumption of Newfoundland Offshore Helicopter Night Operations and Potential Interactions with Birds, Prepared by LGL Environmental Research Associates, May 2012.
6. Proposal for PM Support, Prepared For Cougar by Gladstone Aerospace Corporation, 29 May 2012.
7. Cougar Company Operations Manual (COM) – Chapter 8
8. Cougar Search and Rescue Operations Manual (SAR OM)
9. An Examination of Survival Rates Based on External Flotation Devices: A Helicopter Ditching Review from 1971 to 2005, Michael Taber and John McCabe, SAFE Journal - Volume 35(1) – Spring 2007.
10. NATO Document RTO-AG-HFM-152, Chapter 5 – The Human Factors of Surviving a Helicopter Ditching by Dr. C.J. Brooks.

1 Introduction

1.1 Background

There is a series of events that create a context that must be appreciated if this report and its recommendations are to be completely understood. The following is a brief summary of these events:

a. On March 12, 2009, a Sikorsky S-92A helicopter crashed about 30 nautical miles from St. John's. The helicopter, carrying 16 passengers and two pilots, was on its way to the SeaRose FPSO, with a first stop planned at the Hibernia platform. The aircraft crashed and sank with the loss of 17 lives. Only one person survived;[1]
b. The Offshore Helicopter Safety Inquiry commissioned by the C-NLOPB and headed by Commissioner Honourable Robert Wells, Q.C., was established in May of 2009 and concluded in October of 2010. It was given the mandate to investigate and report on all aspects of offshore helicopter safety not covered by the Transportation Safety Board[2]. Of a particular interest was Recommendation 12 which recommended that night flying be suspended until all risks are mitigated to an acceptable level; [3]
c. After the loss of Flight 491, the oil operators created a Helicopter Operations Task Force (HOTF) to look at all aspects of helicopter operations, to consult with technical, safety, and aviation experts, and to solicit questions from the workforce. Helicopter operations in the C-NL offshore were voluntarily suspended by the oil operators until the HOTF had completed its work and concluded that it was safe to resume flight operations.[4]
d. The C-NLOPB OHSI Implementation Team was formed in early January 2011 to advise the C-NLOPB (hereafter referred to as "the Board") on the implementation of the 29 recommendations issued by Commissioner Wells. The Implementation Team was composed of individuals from all key stakeholder groups. It was agreed that a comprehensive safety analysis would be the appropriate mechanism to determine whether night transport operations should resume.[5]
e. The Advising Document OHSI Phase I, Recommendation 12 regarding passenger night flights, which was presented to the Canada – Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), provides the conditions that must be met prior to recommencing night flying.

[1] Canada-Newfoundland and Labrador Offshore Helicopter Safety Inquiry, Volume 1 – Report and Recommendations, by The Honourable Robert Wells, Q.C., October 2010, page ix.
[2] Ibid.
[3] Ibid, page 296.
[4] Ibid, page 61.
[5] Operational Safety Risk Analysis (OSRA) of Night Helicopter Transport Operations In the C-NL Offshore Area, Produced by SMS Aviation Safety, November 2011, page 1.

f. In May, 2012, Gladstone Aerospace Corporation, a consulting firm, was asked to provide project management (PM) services, to address the issues raised by the OHSI team. The first task was to develop a work breakdown structure (WBS) to set down a plan for Cougar to be ready to return to night flight operations. This included working with the stakeholders, in particular Cougar Helicopters, to ensure that the approach taken and the progress achieved was discussed and reviewed on a regular basis. This report is a description of the plan, how the Recommendation 12 issues have been addressed, the progress to date and the work yet to be done before night flight operations can resume.

1.2 Purpose

The purpose of this report is to address the recommendations of the OHSI Implementation Team advising document for critical issues that pertain to offshore helicopter operations as addressed by Recommendation 12 of the Offshore Helicopter Safety Inquiry Report.

1.3 Scope

The scope of this report was confined to addressing the following areas of concern:

a. **Search and Rescue (SAR) Capability** – the ability to perform SAR missions in a successful and time effective manner;
b. **SAR Response Time** – Cougar's capability to respond within a desired time frame to an emergency situation requiring the services of the SAR resources resident at Cougar Helicopters in St. John's, NL;
c. **Helicopter Night Ditching** – the capability of the aircraft and its crew to ditch a helicopter safely at night;
d. **S-92A Helicopter Flight Simulator Capability** – the fidelity and capability of the simulator to be sufficient for night flight training to include the training for emergency events such as the ditching of the helicopter;
e. **Helicopter Night Simulator Training Program** – the effectiveness of the Cougar simulator training program to ensure adequate training of crews in night normal and emergency situations;
f. **Fatigue Management Program (FMP)** – the scope of and level of participation in Fatigue Management training to ensure all of Cougar's aircrew, Rescue Specialists, and maintenance personnel are fully aware of the FMP;
g. **Joint Cougar / DND SAR Exercises** – the level of interactivity between Cougar and DND in terms of joint training and procedures are sufficient;
h. **Nocturnal Bird Activity** – the level of risk from bird activity to night flight operations.

1.4 Night Flight – Definition and Context

For the purposes of this report, 'night flying' refers to helicopter transportation that occurs wholly or partially during the hours of darkness. This includes departures and landings at dawn and dusk. According to Transport Canada, night is defined as the period beginning one half-hour after sunset and ending one half-hour before sunrise and, in respect of any place where the sun does not rise or set daily, the period during which the centre of the sun's disc is more than six degrees below the horizon.

In the Newfoundland and Labrador context, flights with some night-time component have historically comprised only a fraction of the overall flying regime for offshore operators (less than ten percent). Regular passenger flights are scheduled for daylight hours, however there are occasions when a flight with a night-time component will be considered.

1.5 Key Performance Indicators (KPI)

The following Key Performance Indicators were developed to give targets that would provide qualitative assessment criteria to determine readiness to commence night flight operations:

a. **Search and Rescue (SAR) Capability**
   i. A resident SAR capability at Cougar capable of night and day operations;
   ii. An acceptable level of training for the SAR crews to include but not be limited to, the following:
      1. Night training;
      2. Night Vision Goggle (NVG) training; and
      3. SAR training.
   iii. Adequate technical capability to conduct SAR operations to include, but not be limited to, the following capabilities
      1. Properly trained crew to include the pilots and the rescue specialists;
      2. Forward Looking Infra-Red (FLIR) Sensor;
      3. NVG;
      4. Hoist;
      5. Rescue & First Responder Medical Equipment; and
      6. Four Axis AFCS to allow coupled approaches to a stable hover for use in reduced visibility conditions.
   iv. Ongoing SAR Risk Assessment (RA) process including mission by mission RA;
   v. AFCS pilot training completed in Night, Day and Instrument Meteorological Conditions (IMC; i.e. in cloud);
   vi. External audit of SAR operations and training; and

vii. Approved Transport Canada low weather limits for NVG and SAR activities.

b. **SAR Response Time**;

i. During Passenger Flight Operations: 20 minute response time, which is defined as the time from being notified of a declared emergency to the aircraft entering the hover prior to departing in response to a SAR request;
ii. Outside Passenger Flight Operations: 45 minute response time; and
iii. Sufficient crews and equipment to perform the assigned SAR mission within the respective timings.

c. **Helicopter Night Ditching**

i. Crews have recent proficiency and currency gained by conducting night ditching training in the flight simulator;
ii. Aircraft capability that enables a safe and effective ditching to a point where the crew and passengers can successfully exit the aircraft after a ditching; and
iii. Ongoing night ditching training program.

d. **S-92A Helicopter Flight Simulator Capability**

i. Detailed night training plan with the following content:

1. Detailed training objectives;
2. Full scope of training spectrum for night operations;
3. Training standards to be achieved by each crewmember.
4. Flight model fidelity to the latest standard (Level D);
5. Training development and tracking of flight crew;
6. Debriefing guidelines; and
7. Follow-Up training process.

ii. Simulator Capability:

1. Flight model fidelity to the latest standard (Level D);
2. Visual acuity and resolution sufficient for night ops training;
3. Instructor Operating Station with ability to control environment, aircraft condition and degraded modes;
4. Models (i.e. Offshore Installations);
5. External environment - 3D ocean sufficient for night ditching training;
6. Special Effects - float deployment sufficient for realistic night ditching training; and

7. Aircraft system functionality – representative and fully operational flight systems that can be practised in a realistic environment.

e. **Helicopter Night Simulator Training Program**

   i. Updated training plan with emphasis on night emergency descent and night ditching; and
   ii. Pilots involved in SAR and/or passenger transport flying will undergo the training.

f. **Fatigue Management Program (FMP)**

   i. All Cougar aircrew will have completed the FMP;
   ii. All Cougar SAR crews will have completed the FMP;
   iii. All Cougar maintenance personnel will have completed the FMP;
   iv. The FMP will be integrated with the Cougar SMS program; and
   v. Fatigue and Human Factors elements are considered prior to each flight during completion of the pre-flight Risk Assessment Matrix (RAM)

g. **Joint Cougar / DND SAR Exercises**

   i. Initial meeting with DND to discuss and agree upon joint procedures and protocols; and
   ii. Table top exercises to trial joint procedures and protocols.

h. **Nocturnal Bird**

   i. Discussion with report author on the implication of nocturnal bird activity on Cougar operations; and
   ii. Change in Cougar flight operations procedures to account for any flight risk associated with nocturnal bird activity.

1.6 Assumptions

Several assumptions were made when compiling this report:

a. **Principle of As Low As Reasonably Practicable (ALARP)**: For the purposes of determining the level of risk associated with night flight operations, the principle of ALARP, used by the Petroleum operators defined as follows, will be used:

   A principle based on the premise that risk to people may be categorised by risks that are;

   So great as to be considered unacceptable or

Sufficiently small to be considered broadly acceptable.

AND

Where a risk is determined to be between these two states, then it is reduced to the lowest level practicable (ALARP), bearing in mind the benefits following its acceptance and taking into account the costs of any further reduction.

b. **Recommendation 12**: This report will only focus on the issues raised in Recommendation 12, albeit within the context of all of the other official reports that have been published on the subject; and
c. **Night Flight Operations**: This report will only deal with issues related to the return to night flight operations.

1.7 Operational Considerations

Before returning to night operations, there are a number of considerations that must be addressed. These are aside from the items discussed in Recommendation 12 of the inquiry.

a. Night flying is a skill that requires constant practice. Therefore, it will be re-introduced in a measured manner to ensure that all pertinent risks are addressed and that all personnel have received the prerequisite refresher training;
b. The crew and support personnel will be trained to a level to support full night operations. In other words, crews will be trained to conduct the entire flight profile at night, which includes the flight from the departure base to the offshore installations and return. The reason for this is that, given the variability of the local weather, it is possible that a flight may end up operating fully at night even though the original plan was to only fly at night for a small segment of the flight;
c. Cougar will continuously enhance its SAR capability to ensure that it reduces the risk associated with any unforeseen event that may occur during flight operations;
d. Cougar has become accustomed to completing passenger operations operating solely during the daylight hours. Therefore, Cougar will thoroughly review its process to ensure they are once again fully harmonized with the operational tempo;
e. The introduction of the SAR AFCS hover transition capability is a beneficial addition to the Cougar capability. However, the crews must develop a significant level of proficiency and knowledge about this new system if they are to operate it safely and effectively; and
f. Operating at night, even within a normal duty cycle, can be more fatiguing for some personnel. Therefore, emphasis will be placed on effective fatigue management.

1.8 Advising Document OHSI Phase I, Recommendation 12

1.8.1 Recommendation 1

The above named document is the main focus point for the return to night flight. [6] As part of recommendation 1 of that report, the following requirements must be met before offshore night flying can recommence. These are summarized as follows:

1. **Requirement 1:** The First Response SAR aircraft dedicated to the C-NL Offshore Industry is equipped with an automatic flight control system ("auto hover"), and the crew are able to meet the wheels-up time specified in OHSI Recommendation 1.
2. **Requirement 2:** The Helicopter Service Provider demonstrates that pilots conducting night flights are capable of successfully ditching in no-light conditions.
3. **Requirement 3:** The fidelity of the S-92A simulator enables pilots undergoing night training to experience circumstances that closely approximate those that can be expected during an actual ditching in no- or low-light conditions.
4. **Requirement 4:** There is a night simulator training program that enables pilots to demonstrate proficiency in normal and abnormal operations while conducting approaches, arrivals, landings, take-offs, departures, and go-arounds at offshore installations while experiencing dynamic operating and environmental conditions.
5. **Requirement 5:** A Fatigue Management Program (FMP) is in place for helicopter transport pilots and First Response SAR pilots. The FMP is customized to account for the operating conditions in the C-NL Offshore Area and the demographic make-up of helicopter pilots working in the Industry.
6. **Requirement 6:** A FMP for maintenance personnel is in place, and the FMPs for pilots and maintenance personnel are integrated with the Helicopter Service Provider's safety management system (SMS).
7. **Requirement 7:** Periodic exercises involving the key responders (e.g., Cougar First Response SAR resources and DND SAR resources) are conducted to simulate the search for a helicopter that has ditched at night and the rescue of its occupants.
8. **Requirement 8:** Studies of nocturnal behaviours of birds that seasonally migrate along the east coast of Newfoundland be commenced and there is a formal commitment to employ findings to develop appropriate mitigation if the studies demonstrate elevated risk caused by nocturnal bird movements.

[6] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012, page 11.

1.8.2 Recommendation 2

Once the requirements of recommendation 1 had been satisfied, the report recommended the following:

> "*Recommendation 2: The Team recommends that if night flight is resumed, a measurement framework needs to be developed. Two performance goals would be required:*
>
> - *Performance Goal 1: Verify that the structure to reduce the risks of night flight is in place and functioning before night flight is resumed; and*
> - *Performance Goal 2: Measure the ongoing attainment of an acceptable level of risk of night flying.*
>
> *The high-level goal of the measurement framework would be to demonstrate that the risks of night helicopter transport operations resulting from this option are being managed to an acceptable level of risk.*" [7]

1.8.3 Recommendation 3

The report offered another recommendation on the subject of different 'levels' of night Flight:

> "*Recommendation 3: The Team recommends that the C-NLOPB consider different 'levels' of night flight. As noted in page 2 of this Advising Document, the Team examined a number of different levels of night flight for the C-NL Offshore Industry. If the Board accepts Recommendations 1 and 2, the Team recommends that C-NLOPB staff examine the feasibility of operating a multi-tiered system with different levels of night flight.*" [8]

1.9 Schedule

Cougar has produced a detailed Microsoft Project Schedule and Work Breakdown Structure, which had been distributed amongst the stakeholders. This schedule is tracked and updated on a regular basis. The latest version is attached at Appendix A.

[7] Ibid, page 13.
[8] Ibid, page 13.

2 Recommendation 1 – Requirement 1: Search And Rescue (SAR) Response

2.1 Night Flying Prerequisite

With respect to SAR operations, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 1****: The First Response SAR Aircraft dedicated to the C-NL offshore Industry is equipped with an AFCS (or auto hover) and the crew are able to meet the wheels-up time specified in OHSI Recommendation # 1.*

The "wheels-up time" is in reference to the requirement for Cougar to be able to have a SAR helicopter airborne ready to conduct SAR operations within 20 minutes during passenger flight operations and 45 minutes outside passenger flight operations from the time they are requested to respond.

2.2 Key Performance Indicators

The Key Performance Indicators for meeting this requirement are as follows:

a. A resident SAR capability at Cougar capable of night and day operations;
b. An acceptable level of training for the SAR crews to include but not be limited to the following:
    i. Night training;
    ii. Night Vision Goggle (NVG) training; and
    iii. SAR training.
c. Adequate technical capability to conduct SAR operations to include, but not be limited to, the following capabilities
    i. Trained crew to include the pilots and the rescue specialists;
    ii. Forward Looking Infra-Red (FLIR) Sensor;
    iii. NVG;
    iv. Hoist;
    v. Rescue & First Responder Medical Equipment; and
    vi. Four Axis AFCS to allow coupled approaches to a stable hover for use in reduced visibility conditions.
d. Ongoing SAR Risk Assessment (RA) process including a mission by mission RA;
e. Night, Day and Instrument Meteorological Conditions (IMC; i.e. in cloud) AFCS pilot training completed;
f. External audit of SAR operations and training;
g. Approved Transport Canada low weather limits for NVG and SAR activities;

h. During passenger flight operations: 20 minute response time, which is defined as the time from being notified of a declared emergency to the aircraft entering the hover prior to departing to respond to SAR request;
i. Outside passenger flight operations: 45 minute response time; and
j. Sufficient crews and equipment to perform the assigned SAR mission within the respective timings.

2.3 SAR Concept

The term SAR is used frequently but can mean different things to different people. Therefore it is important to define this term with respect to the operations at Cougar Helicopters. The SAR capability provide by Cougar is dedicated to providing rapid response to any in-flight incident that may occur during passenger transport operations between the shore base and the destination offshore installations as well as responding to customer marine emergencies such as vessel in distress, man overboard etc.. The SAR response is intended to provide the following capability in general terms:

a. **Response**: Rapid response as defined above;
b. **Helicopter Search Capability**: A helicopter capable of conducting search operations under at least the same weather conditions that are permitted for the transport of passengers;
c. **Helicopter Rescue Capability**: A helicopter capable of performing rescue operations, which includes hoisting potential survivors out of the water at day and night; and
d. **Trained Crew**: A crew trained to the appropriate level of proficiency and currency to permit them to conduct search operations over the water day and night. This also includes providing initial first responder treatment sufficient to stabilize survivors until they reach the medical care that can be provided by a hospital.

2.4 SAR Capability - Aircraft

The current SAR capability includes two S92A helicopters similar in capability to the current helicopter used to transport passengers to and from the offshore installations.

a. **Addition Automatic Hover Transition Capability – SAR Mode**: The SAR helicopters have a four axis Automatic Flight Control System (AFCS) functionality that has been added to the current configuration. This allows the pilots to designate a desired hover point using the AFCS and the aircraft will safely and effectively plan an automatic transition to a desired hover point and altitude;

b. **Rescue Hoist**: The aircraft is equipped with a rescue hoist that enables the rescue specialist to lift survivors out of the water. The hoist is equipped with dual winch heads that allows hoisting operations to continue in case of a mechanical failure or even a cable break of one winch. The rescue hoist is electrically powered and controlled with a capacity of 600 pounds (273 Kg) and a speed of up to 325 feet (100 m) per minute. It is operated by the rescue specialist from the aft cabin;

Figure 1 – S92A Rescue Hoist

c. **Forward Looking Infra-Red (FLIR)**: The SAR helicopters are equipped with a FLIR system that enables rescue specialists to detect objects and/or people based on their heat signature irrespective of weather or lighting conditions (figure 3). The installation consists of an externally mounted gyro stabilized infrared imager, color camera and laser pointer, a pedestal mounted display and pendant style hand controller as well as a FLIR workstation in the cabin. The FLIR system is augmented by use of Night Vision Goggles (NVG);

Figure 2 – S92A FLIR System

Figure 3 – An example of FLIR Image

d. **Search Light**: The aircraft is equipped with a 450 watt searchlight that is mounted on the aft of the hoist support. A switch on the hoist operator's control panel is used to turn the searchlight on or off. The light is mounted on a swivel and includes a handle so that the operator can adjust the searchlight beam;

Figure 4 – Searchlight

e. **Nightsun® Searchlight System**: The Nightsun® Searchlight System is a versatile, mobile, high intensity light source. When properly installed and operated, it can flood a large area with light from a safe distance. The searchlight uses an air cooled, high intensity xenon arc lamp. It emits light that is the same color as daylight, starts rapidly, and can be operated continuously or started and stopped to meet operational requirements. The Gimbal assembly that supports the Searchlight enables users to aim the Searchlight beam at various positions with respect to azimuth (horizontal directions) and elevation (vertical directions). The

Searchlight responds to directional commands from a hand operated Control Box in the helicopter cabin or can be automatically linked to follow the FLIR;

Figure 5 – Nightsun® Searchlight System

f. **Night Vision Goggles (NVG)**: The SAR crews will be supplied with and trained to use NVG. This is a light intensification device that amplifies the available ambient light and operates in both the visual and near Infra-Red part of the electro-magnetic spectrum. This means that the crew now have a SAR capability that is equal to if not in some cases greater than what is possible with the naked eye during day light operations. Small lights can be seen at great distances at night, which can enhance the search for survivors. This image shows the level of detail that can be seen through NVGs; and

NIGHT VISION IMAGE

g. **Health Usage Monitoring System (HUMS)**: The installed HUMS provides daily early warning on any developing trends related to degrading performance of parts such as bearings. It is also capable of monitoring long term trends of vibration level changes and operating temperature levels, which provide early warning of component failure and is a built in feature of the helicopter. In addition, Cougar not only monitors trends during nightly maintenance, but the data is reviewed between flights.

2.5 SAR Capability – Personnel

2.5.1 Overview

Cougar has assigned dedicated and highly trained pilots and SAR rescue specialists to perform the assigned SAR functions:

a. There are 12 SAR pilots; and
b. There are 22 rescue specialists.

The pilots also fly passenger flights to maintain their currency on the aircraft for normal passenger operations, obtain more exposure to IFR procedures and to remain in contact with the prime operational function of the company.

2.5.2 SAR Pilots

The SAR pilots are highly trained with extensive experience in off-shore aviation, some of whom have previous military SAR experience. To augment this experience, the Cougar SAR organization has a detailed training plan that ensures SAR pilots remain proficient in SAR operations and have the desired level of readiness necessary to conduct missions.

2.5.3 Rescue Specialist

One of the most significant contributions to Cougar's SAR capability is the ability embodied in its Rescue Specialists. Working as part of a well-coordinated and highly trained crew, they support the search effort, conduct the rescue of survivors and provide first response medical treatment. This capability allows the Cougar SAR crew to locate people in the water quickly, rescue them and then keep them stabilized from a medical perspective until they can be delivered to a medical facility.

The term Rescue Specialist refers to the crews who performed their duties in the aft end of the S92A Helicopters. Cougar's Rescue Specialists come from diverse backgrounds that include military SAR and civilian SAR. Their SAR crews are unique in that they commonly hold dual qualifications as rescue person and hoist operator. They also have extensive experience in many climates and environments including Arctic SAR, marine and ship borne operations.

Although well experienced, Cougar's SAR crews complete a rigorous initial and recurrent training program that ensures continuous currency and competency. This is conducted through the use of ground school and regularly scheduled flight training exercises. Cougar Rescue Specialists are certified as Advanced Medical First Responders and some are paramedic (PCP, P-II) certified. The Advanced Medical First Responder (AMFR) capability includes monitoring and reporting on vital signs, oxygen therapy, Automated External Defibrillation (AED) and other advanced first aid skills. The ability to conduct night rescue has been enhanced with the introduction of NVG's and the aft cabin aircraft hover control system.

Cougar Rescue Specialists are experienced and proficient in marine rescue duties which include the following areas of expertise:

- Installation, Support Vessel, Shuttle Tanker Medevac;
- Installation Evacuation;
- Aircraft Ditching (open water rescue);
- Location and Recovery from Lifeboats, Life rafts and FRC's; and
- Support Vessel / Shuttle Tanker Distress.

Medical kits provided as part of the SAR equipment include such items as AED (Automated External Defibrillator), vital signs monitoring equipment, airway management supplies, oxygen therapy devices, stretchers, immobilization devices, splints, burn kits, dressings and bandages. A list of the equipment available to the Cougar Rescue Specialists is attached as Appendix C.

2.5.4 SAR Operations Manual

Cougar Helicopters has produced a SAR operations manual that details the capability, training requirements and SAR operational procedures. The intent of the manual is to set a common standard for the preparation for and execution of all SAR activities. This manual and the SAR operations was the subject of SAR audit, which was conducted by an external agency independent of Cougar Helicopters. This audit was done by personnel who have had extensive experience in conducting and leading SAR operations.

2.6 SAR Training

To achieve the desired level of readiness, Cougar has implemented a comprehensive in-house training program for the SAR group that has the following elements:

a. **SAR AFCS Mode Training**: The flight training on the new SAR AFCS mode functionality for the SAR pilots is nearing completion. Cougar will conduct standard training profiles in the following conditions:
   i. Day;
   ii. Instrument Meteorological Conditions IMC (i.e. in bad weather) – completed; and
   iii. Night.
b. **Night Training – SAR Crews**: This training includes take-offs, landings, navigation, instrument flight, and hoisting at the airfield and from local ships;
c. **Night Vision Goggle (NVG) Training**: This training will be conducted in two phases. The first phase includes basic NVG and NVG instructor training for eight SAR pilots. The second phase of training involves NVG familiarization training on the S92A helicopter; and

d. **Night Take-offs and Landings – Offshore Installations:** This is planned for all SAR crews and line pilots. While this training is being conducted in the simulator, all aircraft Captains conduct live training in the actual helicopter at the offshore installations.

2.7 SAR Response Time

Cougar currently meets the stated requirements of 20 minutes response time during normal passenger flight operations and 45 minutes outside of normal passenger flight operations. Passenger operations in this context is when passenger flights are airborne and outside normal operations is when no passenger flights are airborne and support is ready for marine or installation emergencies. The response time is practised and confirmed on a regular basis by having no-notice practise drills.

2.8 SAR Capability – External Audit

As part of its continuous improvement program, Cougar had commissioned an external audit of its SAR program that was performed by a reputable outside company. The company, "The Squadron", which is based in United States, is a group of former SAR professionals from the US Coast Guard. The audit covered the following areas:

a. Pilot/Crew Training Syllabi;
b. Operational SAR Doctrine & SOPs;
c. Operations Center Practices/Protocols;
d. Risk Assessment & Management;
e. Safety Management System (SMS) Processes;
f. SAR Operational Control processes;
g. Pilot/crew qualifications, training & documentation processes;
h. Mission planning, risk management & fatigue management;
i. SMS processes;
j. In-flight Assessments;
    i. Internal SAR training flight;
    ii. Simulated SAR scenario; and
k. Identify Strengths & Opportunities for Improvement.

2.9 SAR Weather Limits

Cougar is currently operating with the initial weather limits for the automated descent to hover using the newly installed SAR AFCS flight profile with limits currently established at 150 foot cloud ceiling and 3nm visibility (night) and ½ nm visibility (day). Cougar has submitted two letters to Transport Canada with respect to weather limits and night vision operations, which will result in lower weather limits for SAR and NVG operations. While they are separate letters, they are linked and thus are being considered as a package by Transport Canada. The following is a synopsis of these letters:

a. **Intent to reduce IMC and night approach limits to a rescue site in Search and Rescue Operations**: the purpose of this letter is to request reduced weather minima for day, night and NVG operations. While the new limits will not impact the commencement of passenger transport night operations or SAR operations for day and night flights directly, the approval for night vision weather minima is required to further reduce the current minima; and
b. **Implementation of Night vision Goggles (NVG) in Search and Rescue Operations**: the purpose of this letter is to make amendments to current operations manual to permit Cougar to conduct night vision operations commensurate with the requirements of the SAR mission.

2.10 Summary of Safety Enhancement

While the safety of flight operations at Cougar Helicopters has always been a high standard, there have been significant enhancements in the past few years. The following is a summary of the safety enhancements:

a. Two SAR capable S92A helicopters:
b. Ongoing SAR Risk Assessment process;
c. External audit of SAR operations and training;
d. Approved Transport Canada low weather limits for SAR activities;
e. Updated night flying program for SAR and Passenger flight pilots;
f. Approved Night Vision capability for SAR crews; and
g. Demonstrated SAR response time of 20 minutes during normal operating hours and 45 minutes outside normal operating hours

2.11 Conclusion

Based on the current and planned accomplishments with respect to enhancing the SAR capability, the prerequisite with respect to SAR readiness (Requirement 1) as stated in the OHSI Phase I report[9] has been met.

[9] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012.

3 Recommendation 1 – Requirement 2: Emergency Ditching

3.1 Night Flying Prerequisite

With respect to emergency helicopter ditching, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 2:*** *The Helicopter Service Provider demonstrates that pilots conducting night flights are capable of successfully ditching in no-light conditions.*

While the recommendation makes reference to "no-light" conditions, the intent is to address emergency ditching under all reduced lighting conditions. Therefore, it is assumed that this recommendation is meant to address "low-light" conditions.

Ditching is part of a sequence of actions that are taken by the crew if warranted by the situation:

a. Emergency descent from cruise altitude based on the analysis of a current or impending aircraft malfunction for which descending closer to the surface of the ocean is prudent;
b. Controlled ditching into the water, which involves the pilot's landing the helicopter while under power on the surface of the ocean in accordance with the procedures detailed in the Rotorcraft Flight Manual (RFM); and
c. Emergency evacuation of all passengers after the engines and rotor have stopped, and the emergency floats have deployed. The latter is an event that happens automatically once the helicopter comes into contact with the water.

3.2 Key Performance Indicators

The Key Performance Indicators for meeting this requirement are as follows:

a. Crews with recent proficiency and currency to conduct night ditching;
b. Aircraft capable of conducting a safe and effective ditching to a point where the crew and passengers can successfully exit the aircraft after a ditching; and
c. Ongoing night ditching training program.

It is important to note that there is no circumstance where ditching in the ocean can be considered a normal flight action. The ocean is a dynamic environment which is

difficult to predict even under the best of conditions. However, there are effective procedures that can increase the chance of a successful ditching.

3.3 Aircrew Proficiency & Training

Cougar has an established program for conducting night flight training in the S92A. This program consists of training in the actual aircraft and in the full flight simulator (FFS). Cougar continuously cycles pilots through this program and all pilots are scheduled to go through this training. The initial part of the emergency profile, the emergency descent, is practised during normal night training sessions, both in the aircraft and the simulator. However, the remaining part of the profile, as described above, can only be practised in the FFS. This is currently part of the FFS Training Program where crews can practise the entire emergency descent profile to ditching in the water under visual flight conditions that closely replicate actual conditions. This was successfully demonstrated to the oil company's aviation advisors as well as the representatives of the C-NLOPB. Cougar tracks pilot proficiency and currency with respect to night operations on a regular basis. This is currently done through Cougar's company operations software: FOIMS.

3.4 Aircraft Capability

As described in the S92A Rotorcraft Flight Manual (RFM) [10], an enhanced emergency flotation system is designed to keep the helicopter upright and afloat long enough for all crew and passengers to evacuate the aircraft in mid sea state with wave heights ranging from 12 to 20 feet and winds from 18 to 33 knots.

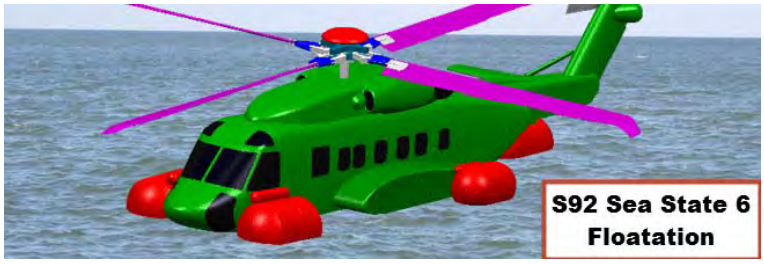

Figure 6 – S92A Emergency Floats and Life Raft

Two forward float bags are mounted below the cockpit jettisonable windows; one aft bag is installed externally on the underside of the tail section. There are two additional sponson floats installed on the left and right sponsons. When armed, the flotation system

[10] Rotorcraft Flight Manual, Revision No. 3, Sikorsky Model S92A, Part 2, SA S92A-RFM-003, Date of Issue: OCTOBER 15, 2005, Date of Revision: March 16, 2007.

is activated by water contact or by the flight crew. Life rafts are stowed in the forward section of each sponson. The two rafts can be deployed electrically from the cockpit or manually by pulling D-rings on the sponsons.

3.5 Summary of Safety Enhancement

Using the concept of risk management known as ALARP (as low as reasonably practicable) and current aircraft systems and equipment, Cougar helicopters has demonstrated that it has done everything feasible to ensure that its crews are properly trained to conduct helicopter ditching in low visibility and low light conditions. The majority of this training has been conducted in the FFS, which is an excellent training enabler for this type of procedure. This is part of the current Cougar training plan and pilots will be required to repeat this training on a regular basis throughout the year.

3.6 Conclusion

Based on the current and planned training with respect to ensuring that the Cougar crews and aircraft are capable of conducting a ditching in reduced lighting conditions, the prerequisite with respect to helicopter ditching (Requirement 2) as stated in the OHSI Phase I report[11] has been met.

[11] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012.

4 Recommendation 1 – Requirement 3: Full Flight Simulator (FFS) Fidelity

4.1 Night Flying Prerequisite

With respect to the fidelity of the FFS, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 3:*** *The fidelity of the S-92A simulator enables pilots undergoing night training to experience circumstances that closely approximate those that can be expected during an actual ditching in no- or low-light conditions*.

The term fidelity is one that encompasses a number of areas and is driven by several factors (Appendix B). The current FFS is certified by the Federal Aviation Administration (FAA) as well as Transport Canada (TC) as a Level D simulator, which is the highest level of certification with respect to simulation fidelity.

4.2 Key Performance Indicators

The Key Performance Indicators for meeting this requirement are as follows:

a. Flight model fidelity sufficient for night ops training;
b. Visual acuity and resolution sufficient for night ops training;
c. Instructor Operating Station with ability to control environment, aircraft condition and degraded modes;
d. Models (i.e. offshore installations);
e. External environment - 3D ocean sufficient for night ditching training;
f. Special Effects - float deployment sufficient for night ditching training; and
g. Aircraft system functionality - all flight systems operational and can be practised in a realistic environment.

4.3 Simulation Fidelity

With respect to FFS, simulation fidelity refers to the ability of the FFS to replicate the real environment in the following areas:

a. **Aircraft Flight Model**: The flight model consists of complex algorithms that try to replicate how the actual helicopter responds to pilot and external inputs all within the context of the desired environmental conditions (i.e. weather, wind, altitude and temperature). The pilot makes an input to the controls and expects a

response from the helicopter similar, if not identical, to that experienced in the actual helicopter in same flight conditions. If there is a difference between the two, the crew could learn techniques that are detrimental to flying the actual helicopter. This phenomenon is known as negative training;

b. **Visual System**: Aside from onboard systems, the pilot receives the majority of flight cues from the visual system that attempts to replicate the real world. While it is not perfect replication of the real world, it needs to show sufficient detail to provide the necessary visual cues and to enable the pilot to experience what is known as the "suspension of disbelief". This occurs when the realism of the visual simulation is at a sufficient level that allows the pilot to actually believe that the simulated environment is real. Visual system fidelity is broken down into two components:

    i. The visual system scene observed by the pilot has the desired number and quality of visual cues to allow the pilot to effectively control the aircraft; and
    ii. The response of the visual system due to pilot and/or external inputs (i.e. turbulence) is sufficiently rapid to allow the pilot to make the correct follow-on inputs. The time taken from the pilot input to the aircraft's response to that input being represented in the visual scene is known as the throughput delay;

c. **Systems Performance**: In addition to replicating the helicopter's flight handling and performance characteristics, it is essential that all aircraft systems are replicated to the highest degree of fidelity in terms of function and interaction with other systems; and
d. **External World**: The external world is an important aspect that must be managed by the pilots when flying in the real world. This includes elements such as Air Traffic Control, other air traffic, weather and ground/satellite based navigation systems (i.e. GPS / Instrument Landing System (ILS). A good simulator will provide this environment, which enhances the training experience.

The fidelity of each of these areas contributes to the overall fidelity of the simulator.

4.4 Current Simulator

The current simulator being used by Cougar Helicopters is a Level D FFS that is operated by Flight Safety International. Surrounding the S92A simulator cockpit, the VITAL-X five-channel visual system presents a realistic panorama covering 220 degrees horizontally and 60 degrees vertically.

Figure 7 – FSI S92A Full Flight Simulator

The simulator is a full motion simulator that provides the crews with a realistic training environment augmented by the capability to inject aircraft faults / failures to allow the aircrew to practice their procedures. To ensure that the training is custom designed to meet Cougar Helicopter's needs, Cougar provides its own instructors who instruct in accordance with the Cougar training plan.

Figure 8 – FSI S92A FFS Sample Visual Scenes

4.5 Simulator Evaluation – Night Training

A simulator evaluation was conducted by the aviation advisors for the oil companies. Representatives of the C-NLOPB observed the capabilities of the FFS on 23 August 2012. The evaluation consisted of the following events:

a. Overview of the simulator training plan;
b. Overview of the simulator;
c. Briefing of the demonstration profile;
d. Simulator training demonstration; and
e. Debrief on the capability.

During the simulation demo, the following excerpts from the Cougar night training plan were demonstrated:

a. Take-off at night from St. John's airport;
b. Transit at night to the offshore installation;
c. Take-off and Landing at the offshore installation;
d. Emergency profiles at night;
e. Emergency descent from enroute altitude at night; and
f. Ditching at night.

Overall, the team successfully demonstrated to the C-NLOPB observers present that the simulator has the adequate fidelity to provide the desired level of training, especially at night. There were sufficient cues to permit ditching at night (see the images in figure 8 for reference). Furthermore, the 3D ocean model simulated the environment that the crew could expect once the aircraft had ditching, which included the pitching of the helicopter and the deployment of the floats once it is in the water.

4.6 Summary of Safety Enhancement

The current simulator has shown that it has the capability and fidelity that is required to permit realistic night flight training. It can provide the crews with the dynamic environment that is necessary for training them to successfully ditch the aircraft during an emergency situation. As will be discussed in greater detail in the next section, the simulator is only a training tool; the updated training plan incorporates an intensive and comprehensive approach to leveraging the capabilities of the simulator. The combination of the FFS and new training plan has increased the pilot's operational skill sets.

4.7 Conclusions

Based on the current and planned capability of the S92A FFS and as shown during the recent evaluation/demonstration, the fidelity of the S-92A simulator enables pilots

undergoing night training to experience circumstances that closely approximate those that can be expected during an actual ditching in low-light conditions, the prerequisite with respect to helicopter ditching (Requirement 3) as stated in the OHSI Phase I report[12] has been met.

[12] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012.

5 Recommendation 1 – Requirement 4: Simulator Training Program

5.1 Night Flying Prerequisite

With respect to the Simulator Training program, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 4:*** *There is a night simulator training program that enables pilots (as individual pilots, and as a crew) to demonstrate proficiency in normal and abnormal operations while conducting approaches, arrivals, landings, take-offs, departures, or go-arounds at offshore installations while experiencing dynamic operating and environmental conditions.*

As mentioned previously, the FFS is only a tool even though it may be an impressive one. The success of any training program is a well-thought out and comprehensive training plan.

5.2 Key Performance Indicators

The Key Performance Indicators for meeting this requirement are as follows:

a. Detailed night training plan with the following content:

   i. Detailed training objectives;
   ii. Full scope of training spectrum for night operations with emphasis on night emergency descent and night ditching;
   iii. Training standards to be achieved by each crewmember;
   iv. Instruction guidelines;
   v. Training development and tracking of flight crew;
   vi. Debriefing guidelines;
   vii. Follow-Up training process; and
   viii. All Pilots involved in SAR and/or passenger transport flying will undergo the training.

5.3 Simulator Training Program

The simulator training program has recently been updated, which increases the amount of the night training from 2 to 4 hours and focuses on performance based learning. Pilots undergo this training up to 4 times per year. The standard training session consists of a four hour simulator block in which Crew members will perform both Pilot Flying and Pilot Monitoring duties (Appendix D). The crew are asked to perform a series of currency

exercises, in accordance with Cougar Helicopters Standard Operating Procedures (SOP) [13], while conducting an operational flight at night from St. John's International (CYYT) to an offshore Jack-up installation called the "Treasure Swan". Each crewmember will complete a minimum of 5 Take-Offs and Landings with all associated emergency/malfunction exercises demonstrated to a satisfactory level. The operational portion of the session provides a valuable opportunity for the instructor to evaluate the crew's ability to carry out a night offshore flight while introducing scenarios requiring technical knowledge, aircraft handling and CRM core principles such as: effective communication, problem solving, workload management and situational awareness. The training plan has a qualifying standard against which the aircrew are assessed. One of the qualifying standards is the procedure for conducting an emergency descent to a ditching, which is presented below as an example of the plan's layout and content:

Emergency Descent

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Conclude that an emergency descent is the correct course of action given the situation;
2. Carry out ECL Immediate Actions;
3. Initiate and stabilize the descent by using an appropriate level of automation;
4. Carry out ECL items (Emergency Descent – Power On);
5. Level the aircraft at an altitude of 200 feet (Radio Altitude) above the water surface in a smooth and controlled manner;
6. Use proper crew coordination and callouts.

Ditching

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Conclude that an aircraft ditching is the correct course of action given the situation;
2. Carry out ECL items;
3. Control the rate of descent and IAS (G/S) to touchdown;
4. Smoothly touchdown on the surface;
5. Carry out the ECL items for Emergency Evacuation - At Sea; and
6. Use proper crew coordination and callouts.

[13] Cougar Helicopters Inc. SK-92 Helicopter Standard Operating Procedures, Edition III Chapter 7, Amend 0 dated 15Dec11, page 7-16.

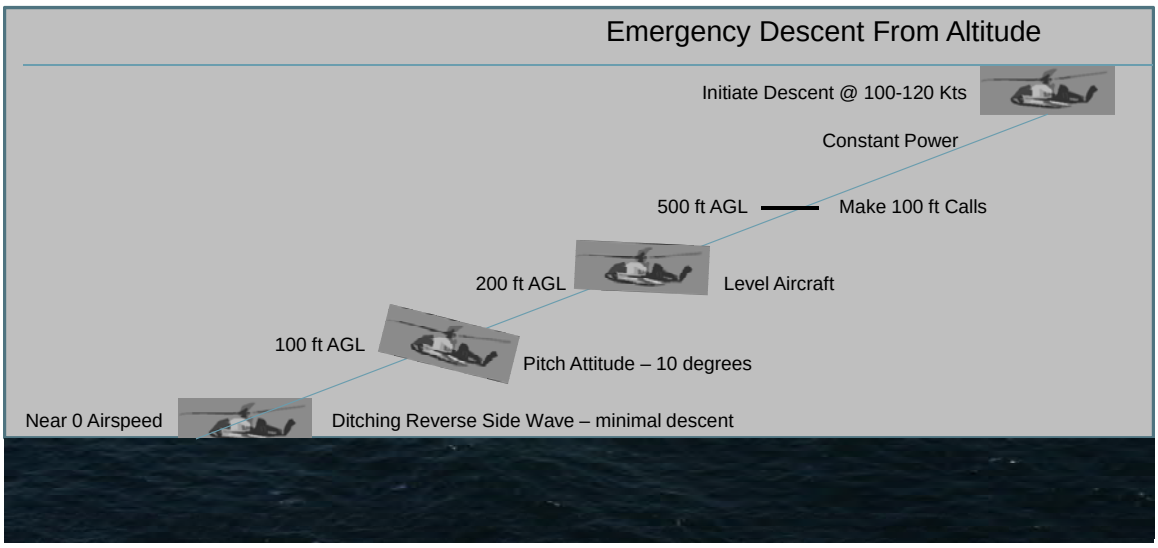

Figure 9 – Standard Cougar Ditching Procedure SOP[14]

5.4 Simulator Training Program Evaluation

As mentioned in paragraph 4.5, a simulator evaluation was conducted by the aviation advisors for the oil companies and the C-NLOPB on the 23 August 2012. One of the briefing items was the training plan, which was presented by the company Chief Training Pilot. The plan was acknowledged as being very comprehensive and well exceeded the needs of requirements or Recommendation 4, which was confirmed during the simulator demonstration where samples of the plan, teaching points, and assessment criteria were shown.

5.5 Summary of Safety Enhancement

The current training plan meets the intent of this requirement. It details the entire training profile, the standards to which these profiles must be flown, guidance to the instructors and scoring tables. By using their crew information management system, Cougar is able to track the performance of pilots over time to determine if areas of concern are particular to a certain individual or becoming a trend amongst the pilots. This gives Cougar the tools to take proactive action to effectively address deficiencies, if they exist, in current SOPs and/or the way they are interpreted. This improvement in the night simulator training plan is one of the major safety enhancing activities over the past few months at Cougar Helicopters.

[14] Cougar Helicopters Inc. SK-92 Helicopter Standard Operating Procedures, Edition III Chapter 7, Amend 0 dated 15Dec11, page 7-16.

5.6 Conclusions

The current Cougar Helicopters Night Simulation Training Plan, as briefed during the recent evaluation/demonstration, enables pilots to demonstrate proficiency in normal and abnormal operations while conducting approaches, arrivals, landings, take-offs, departures, or go-arounds at offshore installations, while experiencing dynamic operating and environmental conditions. The prerequisite with respect to night simulation training program (Recommendation 4) as stated in the OHSI Phase I report[15] has been met.

[15] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012.

6 Recommendation 1 – Requirement 5 & 6: Fatigue Management Program

6.1 Night Flying Prerequisite

With respect to the Fatigue Management program, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 5:*** *A Fatigue Management Program (FMP) is in place for helicopter transport pilots and First Response SAR pilots. The FMP is customized to account for the operating conditions in the C-NL Offshore Area and the demographic make-up of helicopter pilots working in the Industry.*
>
> ***Requirement 6:*** *An FMP for maintenance personnel is in place, and the FMPs for pilots and maintenance personnel are integrated with the Helicopter Service Provider's safety management system (SMS).*

Fatigue is a relevant issue when dealing with night flying operations. When crews are expected to shift between night and day shifts on a regular basis, care has to be taken to ensure that their performance is not degraded by fatigue, especially over the long term.

6.2 Key Performance Indicators

The Key Performance Indicators for this requirement are as follows:

a. All Cougar aircrew will have completed the FMP;
b. All Cougar SAR crews will have completed the FMP;
c. All Cougar maintenance personnel will have completed the FMP;
d. The FMP will be integrated with the Cougar SMS program; and
e. Fatigue and Human Factors elements are considered prior to each flight during completion of the pre-flight Risk Assessment Matrix (RAM).

6.3 Fatigue Management Program

Cougar Helicopters is in the process of providing enhanced Fatigue/Personal Performance training to approximately 250 employees. The training is based on the Transport Canada Fatigue Risk Management System, elements of the ICAO Fatigue Guidelines, FAA Fatigue concepts plus research conducted by Cougar Helicopters. The fatigue training is intended to create a partnership between Cougar and the employees to help establish a balance between the work requirements and employees personal lives. The plan is not a one-time effort but rather will be integrating into the Cougar SMS program to ensure that fatigue is managed over the long term.

In addition to the fatigue training, Cougar has initiated improvements to the Pre-Flight Risk Management Matrix and has purchased a Computer based "Fit for Work" program to evaluate employees fatigue state and provide strategies to deal with it. This approach is unique to Cougar Helicopters and provides them with a tool to allow them to deal proactively with the challenges of fatigue management.

6.4 Summary of Safety Enhancement

While Cougar has always had an effective Safety Management System (SMS), the addition of the Fatigue Management Program will contribute significantly to the safety of the overall flying operation, in particular night flying. Furthermore, since it is integrated into the corporate SMS program, it is an issue that will be addressed on an ongoing basis.

6.5 Conclusion

A Fatigue Management Program (FMP) is in place for helicopter transport pilots, maintenance personnel, Rescue Specialists and First Response SAR pilots. The FMP is customized to account for the operating conditions in the C-NL Offshore Area and the demographic make-up of the personnel working in the industry as such, the prerequisite with respect to night simulation training program (Requirements 5 & 6) as stated in the OHSI Phase I report has been met.

7 Recommendation 1 – Requirement 7: Joint Exercises with DND

7.1 Night Flying Prerequisite

With respect to conducting joint exercises with the SAR community within DND, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement* 7:** Periodic exercises involving the key responders (e.g., Cougar First Response SAR resources and DND SAR resources) are conducted to simulate the search for a helicopter that has ditched at night, and the rescue of its occupants.

7.2 Key Performance Indicators

The Key Performance Indicators for this requirement are as follows:

a. Initial meeting with DND to discuss and agree upon joint procedures and protocols; and
b. Table top exercise to trial joint procedures and protocols.

7.3 Joint Training and Protocol Development

DND currently has a SAR capability resident at Gander Airport in NL. This SAR capability is provided by 103 Rescue Squadron which has the Cormorant helicopter (EH 101) and is responsible for providing search and rescue services throughout Newfoundland and Labrador as well as north-eastern Quebec. Consequently, the two SAR capabilities, 103 Squadron and Cougar SAR, need to work closely together. This means having compatible procedures in terms of initial response, the conduct of a search, and rescuing survivors. Cougar Helicopters has initiated contact with 103 Squadron and the two organizations have agreed to discuss SAR protocols and to conduct a table top exercise. This will be the first of a continuous series of exercises that are necessary to ensure the two organizations can work together seamlessly.

7.4 Summary of Safety Enhancement

The SAR capability provided by Cougar Helicopters is novel for this part of Canada. However, SAR is also a national responsibility that is exercised by DND and coordinated through the Rescue Coordination Centres (RCC). The ability to work closely with the SAR capability at DND will certainly enhance response times and safety.

7.5 Conclusions

A joint training tabletop exercise has been planned for 103 Squadron, DND and Cougar Helicopters. This is the first of a series of regular exercises involving the key responders (e.g., Cougar First Response SAR resources and DND SAR resources). The aim is to establish protocols for working together by conducting a simulated search for a helicopter that has ditched at night, and the rescue of its occupants. Given this planned activity, the prerequisite with respect to a joint SAR exercise with DND (Requirement 7) as stated in the OHSI Phase I report has been met.

8 Recommendation 1 – Requirement 8: Bird Nocturnal Behavior Impact

8.1 Report Findings

With respect to the risk posed by bird nocturnal behaviour, the OHSI report stated the following as a prerequisite before a return to night passenger transport operations for Cougar Helicopters:

> ***Requirement 8:*** *Studies of nocturnal behaviours of birds that seasonally migrate along the east coast of Newfoundland be commenced, and there is a formal commitment to employ findings to develop appropriate mitigation if the studies demonstrate elevated risk caused by nocturnal bird movements*.

8.2 Key Performance Indicators

The Key Performance Indicators for meeting this requirement are as follows:

a. Discussion with report author on the implication of nocturnal bird activity on Cougar operations; and
b. Change in Cougar flight operations procedures to account for any flight risk associated with nocturnal bird activity.

8.3 Report on Bird Activity

The report was produced by LGL Environment Research Associates.[16] The primary objective of the study was to answer the following questions:

a. Do birds present hazards to offshore helicopter operations?
b. What studies relevant to bird hazards to aircraft have been conducted in the area?
c. What bird species pose the most risk to helicopters at night?
d. What areas and times might pose the most risk?

The following are the key conclusions of the report: [17]

a. In general, the risk of damaging bird strikes during night helicopter operations from the northern Avalon Peninsula to the offshore oil installations is relatively low in comparison with daylight operations; and
b. The twice daily movements of large numbers of gulls between the Robin Hood Bay regional sanitary landfill and roosting areas undoubtedly poses the greatest

[16] Resumption of Newfoundland Offshore Helicopter Night Operations and Potential Interactions with Birds, Prepared by LGL Environmental Research Associates, May 2012..
[17] Ibid, page 14.

risk to aviation safety on the Avalon Peninsula and adjacent marine waters. However, little of this movement extends beyond the dusk and dawn periods into the night.

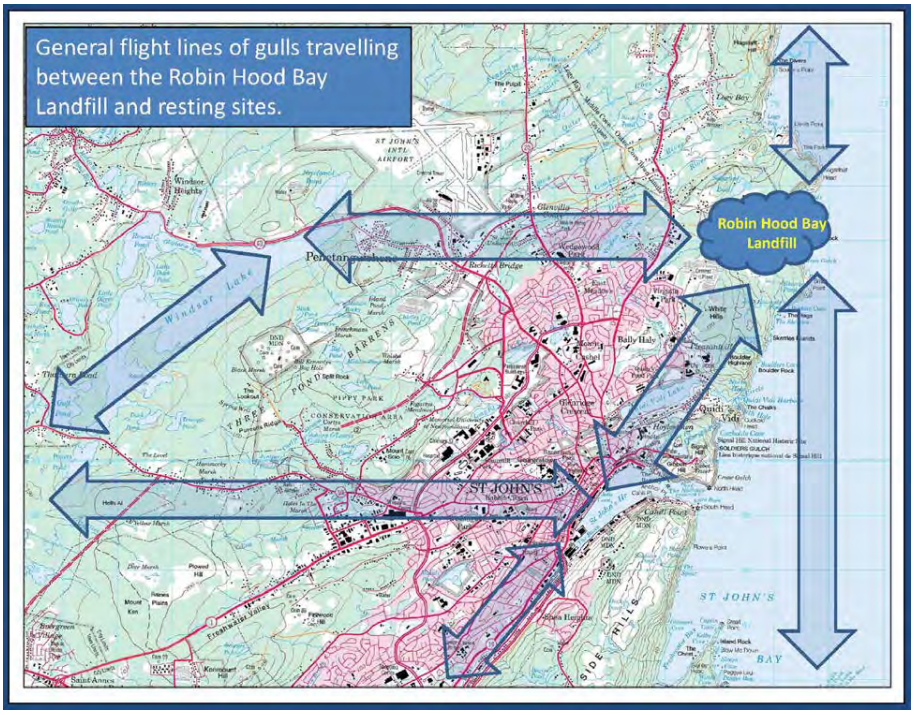

Figure 10 – Major Flight Lines of Gulls in and Around St. John's.[18]

8.4 Summary of Safety Enhancement

While bird strikes can pose a degree of risk for helicopters in flight, this risk is minimal especially when compared to fixed wing operations. Although there is increased bird activity during dawn and dusk, the risk to aviation is relatively low. The decision by Cougar to adjust their flight profiles when required to address this risk reduces this risk even further.

8.5 Conclusions

The report indicates that the risk at night to helicopter operations due to bird activity is lower than that during the day. The only time period where there should be heightened vigilance is at dusk and dawn when birds are transiting to their nesting sites. Cougar Helicopters will follow established departure and arrival routes and adhere to the St. John's airport wildlife program, in accordance with Canadian Aviation Regulations

[18] Ibid.

(CAR), to mitigate any potential conflict. Overall, the risk posed by birds to helicopter flying is very low at any time but is even less at night than during the day. Given this planned mitigation activity by Cougar, the prerequisite with respect to address the potential risk posed by bird nocturnal activity (Requirement 8) as stated in the OHSI Phase I report has been met.

9 Recommendation 2 – Measurement Framework

9.1 Report Findings

Once the requirements of recommendation 1 had been satisfied, the OHSI report recommended the following:

> "*Recommendation 2: The Team recommends that if night flight is resumed, a measurement framework needs to be developed. Two performance goals would be required:*
>
> - *Performance Goal 1: Verify that the structure to reduce the risks of night flight is in place and functioning before night flight is resumed; and*
> - *Performance Goal 2: Measure the ongoing attainment of an acceptable level of risk of night flying.*
>
> *The high-level goal of the measurement framework would be to demonstrate that the risks of night helicopter transport operations resulting from this option are being managed to an acceptable level of risk.*" [19]

9.2 Key Performance Indicators

The following key performance indicators for this recommendation were listed in the Appendix to the OHSI Advising Document:

a. **Performance Requirement 1**: First Response SAR crews successfully locate and evacuate aircraft occupants from water in no-light conditions;
b. **Performance Requirement 2**: Dedicated SAR resources (of the C-NL Offshore Industry and DND) effectively coordinate and successfully complete the search for, rescue, and evacuation of occupants of a helicopter that has entered the water in the C-NL Offshore Area;
c. **Performance Requirement 3**: Pilots of night helicopter transport flights successfully perform normal and abnormal operations;
d. **Performance Requirement 4**: Pilots successfully conduct a ditching in no-light conditions;
e. **Performance Requirement 5**: The risk of fatigue degrading the proficiency of flight crew and maintenance personnel is managed to a level as low as reasonably Practicable; and

[19] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012, page 13.

f. **Performance Requirement 6**: Risk mitigation of night flight is periodically evaluated and, when appropriate, modified.

9.3 Measurement Framework

The measurement framework criteria have been addressed in the previous sections of this report. In addition to this, Cougar helicopters will continuously addressed these criteria as part of their comprehensive risk management system that covers all relevant risks that pertain to flight operations, including those conducted at night. This risk management system is used on regular basis by all flight crews prior to each flight. The following is a summary of the how each of the performance requirements for this recommendation is being and continues to be addressed:

a. **Performance Requirement 1**:
   i. a First Response SAR aircraft, dedicated to the C-NL Offshore area, is equipped with an functional automatic flight control system (or 'auto-hover'), commonly referred to as a four axis system;
   ii. this aircraft and its crew will be capable of responding to emergency situations during flight operations that involve the carriage of passengers. The SAR crews have also demonstrated proficiency in all SAR functions in no or low light conditions. This capability has been augmented by the introduction of the use of NVG by the entire SAR crew;
   iii. the First Response SAR crew has frequently demonstrated the capability to meet the stated response times. This will be monitored and tested on a regular basis; and
   iv. Cougar Helicopters has undergone an audit of their SAR operations recently, the results of which indicate that they meet the proficiency and capability requirements for this mission.

b. **Performance Requirement 2**:
   i. night helicopter passenger transport operations will occur only when Cougar Helicopters SAR resources are known to be able to meet the performance standards that ensure their ability to conduct a successful SAR mission. This will be augmented by the SAR capability provided by the DND; and
   ii. these SAR capabilities will be monitored a regular basis to determine if there are any deficiencies and, if so, how the residual risk will be managed accordingly.

c. **Performance Requirement 3**:
   i. the night proficiency program for Cougar helicopters includes training in both the simulator and the actual aircraft. This training includes normal and abnormal (i.e. emergency) flight operations;
   ii. Cougar has a comprehensive night training program, which includes a regular review by senior management to ensure that it continues to meet the standards necessary for safe and effective night operations. This

simulator has recently been evaluated by the C-NLOPB and has been found to closely approximate the conditions that would be encountered in actual night operating conditions; and

iii. this proficiency is monitored closely by the Cougar supervisory personnel by using the company flight information system to ensure that only crews with the required proficiency and currency are scheduled for SAR and passenger carrying flights.

d. **Performance Requirement 4**:
   i. the Cougar pilots have attended, and continue to attend on a regular basis, simulator training where they have demonstrated the required performance in a simulator in simulated conditions that approximate the conditions that would be encountered during a ditching in the C-NL Offshore Area at night;
   ii. this training was recently evaluated by the C-NLOPB board. They found it met the criteria of this requirement; and
   iii. these performance requirements for this specific training item are detailed in the company training program, which is reviewed on a regular basis for completeness and applicability.

e. **Performance Requirement 5**:
   i. Cougar Helicopters has an ongoing FMP training program;
   ii. this FMP is reviewed for relevance and applicability on an ongoing basis; and
   iii. the fatigue of all aircrew is evaluated prior to each flight using a RAM specifically designed for offshore flight operations.

f. **Performance Requirement 6**:
   i. a study of risks associated with bird migratory patterns at night has been conducted and reviewed. Cougar will take the necessary measures to mitigate this risk. Regardless, this risk is extremely low; and
   ii. Cougar, as part of its ongoing continuous improvement process, will review its night flying operations on a regular basis to ensure that it remains effective and that any new developments in the field of aviation safety are incorporated into the program.

9.4 Conclusion

Cougar has demonstrated that it has a measurement framework in place to meet the performance requirements stated in Recommendation 2. Consequently, it meets both of the performance goals that stipulate the need for a structure to be in place, and functioning, to reduce risks of night flight, and that it measures the ongoing attainment of an acceptable level of risk during night flying.

10 Recommendation 3 – Different Levels of Night Flight

10.1 Report Findings

The report offered another recommendation on the subject of different 'levels' of night Flight:

> "*Recommendation 3: The Team recommends that the C-NLOPB consider different 'levels' of night flight. As noted in page 2 of this Advising Document, the Team examined a number of different levels of night flight for the C-NL Offshore Industry. If the Board accepts Recommendations 1 and 2, the Team recommends that C-NLOPB staff examine the feasibility of operating a multi-tiered system with different levels of night flight.*" [20]

10.2 Different Levels of Night Flight

The OHSI report makes reference to different levels of night flight, each with their own safety requirements. The intent was to ensure that night flights be "reintroduced progressively". [21] While the intent is laudable, creating different categories of night flying would be difficult, from a flight operations perspective, to manage as well as likely to cause confusion amongst the pilots, all of which would increase rather than decrease risk. A crew conducting night flights must be prepared for the entire spectrum of night operations, including the landing and take-offs from an offshore oil facility, even though the original intent was only to transit at night. The rationale for this is that pilots must be prepared in terms of training, proficiency and planning for any eventually that may occur during a flight. An in-flight malfunction or a sudden deterioration in weather could force a crew to return to an offshore oil facility when this may not have been part of their original plan. Therefore, the requirements for conducting the entire spectrum of night operations must be met, regardless of any intent to operate otherwise. Having said this, the offshore oil industry could place operational limitations on the degree of night flying knowing that the crews must be fully prepared for the full scope of night flying irrespective on any imposed limitations.

[20] Advising Document OHSI Phase I, Recommendation 12 Regarding passenger night flights, 09 January 2012, page 13. page 13.
[21] Ibid. page 2.

10.3 Conclusion

The concept of different levels of night flying would be difficult, from a flight operations perspective, to implement and consequently may cause an unintended increase in risk. The original intent to progressively return to night flying has value and is currently under way at Cougar as part of their training program. Therefore, any decision to return to night flying in a progressive manner must be disconnected from the required readiness levels for the Cougar personnel.

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11 Risk of Night Flights

In the inquiry, reference was made to the risks associated with night flying. [22] The assessment of risk associated with night flying and a night ditching was based on testimony from Mr. Michael Taber.

> *"Mr. Michael Taber, Inquiry expert, told us that the crash/ditching survival rate at night is overall 39 percent as opposed to a survival rate of 70 percent in daylight hours. It follows that asking a passenger to fly at night is, in effect, asking him or her to accept a higher level of risk and, indeed, a much higher level of risk if the helicopter is forced to ditch."* [23]

The inquiry report states that the riskiest part of an off-shore worker's employment is the flight in the helicopter to and from the offshore installations, which is even greater at night. The report goes on to say that there is risk to SAR crews trying to perform rescue missions at night, despite the advent of new technology such as NVG and bright (Nightsun) searchlight. However, there is no reference made to FLIR technology on board the Cougar S92A SAR helicopters, which is a greater enabler for successful SAR missions.

While there is an acknowledged degree of risk associated with helicopter flying, in particular night flying, it is important to understand the contributing factors to a successful ditching and the rescue of the passengers:

a. helicopter design type and back-up systems that would reduce the probability of ditching;
b. irrespective of design, the probability of the ditching occurring in the first place;
c. the helicopter warning systems that would provide pilots with sufficient advanced warning of a problem thus allowing sufficient time to make a controlled descent;
d. the type of ditching: controlled or uncontrolled;
e. the effectiveness of helicopter floatation system;
f. the flight instrumentation, aircraft fight control system (aircraft stabilization system) and visual aids available to the pilot to conduct a safe and effective ditching;
g. the training of the crew in ditching operations;
h. the training of the passengers in ditching drills and underwater escape training;
i. the proximity and readiness of SAR rescue crews;
j. the training level and available equipment for the SAR crews;
k. distance from shore when ditching occurs; and

[22] Canada-Newfoundland and Labrador Offshore Helicopter Safety Inquiry, Volume 1 – Report and Recommendations, by The Honourable Robert Wells, Q.C., October 2010, page 205.

[23] Ibid, page 205.

l. the frequency of night flights compared to day flights. In other words, what is the percentage of time a particular passenger will spend in the helicopter during night flight compared to the time spent in helicopter during day flight.

When reviewing papers on the subject, produced by two of the recognized experts in the field of successful ditching written by Michael Taber and John McCabe[24] and Dr. C.J. Brooks[25], it can be seen that comparisons are made between a variety of ditchings over a number years during the day and night. There is no doubt that there is identified risk associated with night ditchings. However, what is not clear is the degree of that risk. In the studies, there appeared to be no mention of the conditions of each ditching. It is safe to assume that the only similarity between each of the aircraft/rotorcraft identified in the studies and the conditions under which the ditching occurred is the fact that they were all involved in a ditching. The aforementioned factors play a significant role in determining the outcome of a ditching, in particular at night. Therefore, unless a study is conducted under exactly the same conditions with the same helicopter type crewed by pilots trained to the same standard, it is difficult to assign a probability risk number in terms of percentage with respect to the survivability rate of a passenger flying at night in an S92A helicopter off the coast of St. John's. The only thing that can be concluded is there is likely a higher risk at night than during the day.

Of course, the term "higher risk" has to be put into context. When discussing the risk of survival after a night ditching in a helicopter, one has to acknowledge the risk of having to conduct a ditching in the first place. The likelihood of a ditching is remote, especially given the recent modifications made to the S92A. Therefore, when we are discussing the risk associated with night ditching survival, the value is lower than most other activities we engage in on a regular basis. For example, figure 11 shows an example of typical probabilities of death[26]. The risk associated with planned flights flown by professionals is significantly less than that driving in a car. This is not to say that every reasonable action should not be taken to reduce the risk associated with night flying and the highly improbable likelihood of night ditching. It should and it has been. Cougar and Sikorsky have gone to extraordinary lengths to enhance the safety of its crews and passengers, be it during the day or at night.

[24] An Examination of Survival Rates Based on External Flotation Devices: A Helicopter Ditching Review from 1971 to 2005, Michael Taber and John McCabe, SAFE Journal - Vol 35(1) – Spring 2007..
[25] NATO Document RTO-AG-HFM-152, Chapter 5 – The Human Factors of Surviving a Helicopter Ditching by Dr. C.J. Brooks.
[26] The Odds of Dying by Robert Roy Britt, Date: 06 January 2005 Time: 02:00 AM ET, Live Science.

Cause of Death	Lifetime Odds
Heart Disease	1-in-5
Cancer	1-in-7
Stroke	1-in-23
Accidental Injury	1-in-36
Motor Vehicle Accident*	1-in-100
Intentional Self-harm (suicide)	1-in-121
Falling Down	1-in-246
Assault by Firearm	1-in-325
Fire or Smoke	1-in-1,116
Natural Forces (heat, cold, storms, quakes, etc.)	1-in-3,357
Electrocution*	1-in-5,000
Drowning	1-in-8,942
Air Travel Accident*	1-in-20,000

Figure 11 –2011 US Figures

12 Conclusion

The objective of this report was to address the critical issues that pertain to offshore helicopter operations as addressed by Recommendation 12 of the Helicopter Safety Inquiry Report[27] such that it can be determined if it is feasible and safe to return to night flight operations. Based on all of the initiatives over the past couple of years, each of the three recommendations in the OHSI report has been successfully addressed. The following is a summary of the requirements associated with Recommendation 1:

1. **Requirement 1:** The First Response SAR aircraft dedicated to the C-NL Offshore Industry is equipped with an automatic flight control system (or 'auto hover'), and the crew are able to meet the wheels-up time specified in OHSI Recommendation 1.
    a. **Two S92A helicopters with the required SAR equipment will be available and ready to conduct SAR operations;**
    b. **The SAR crews will be properly trained to conduct SAR operations in bad weather, day and night;**
    c. **The SAR response time is under 20 minutes during normal flight operations and under 45 minutes outside normal flight operations;**
    d. **The SAR crews will be trained to operate with NVG; and**
    e. **The SAR crews have been trained to use the SAR AFCS (i.e. "auto-hover") capability; and**
    f. **Cougar has conducted a SAR audit of its capability by an outside agency.**
2. **Requirement 2:** The Helicopter Service Provider demonstrates that pilots conducting night flights are capable of successfully ditching in no-light conditions.
    a. **Crews have been trained to conduct ditching in the flight simulator; and**
    b. **Procedures exist that describe the correct procedure for emergency descent and ditching.**
3. **Requirement 3:** The fidelity of the S-92A simulator enables pilots undergoing night training to experience circumstances that closely approximate those that can be expected during an actual ditching in no- or low-light conditions.
    a. **The fidelity of the current S92A simulator enables pilots to undergo valuable and relevant night training in all normal and emergency profiles, including ditching in low light conditions.**
4. **Requirement 4:** There is a night simulator training program that enables pilots (as individual pilots, and as a crew) to demonstrate proficiency in normal and abnormal operations while conducting approaches, arrivals, landings, take-offs,

[27] Canada-Newfoundland and Labrador Offshore Helicopter Safety Inquiry, Volume 1 – Report and Recommendations, by The Honourable Robert Wells, Q.C., October 2010, page 296.

departures, or go-arounds at offshore installations while experiencing dynamic operating and environmental conditions.

   a. **Cougar has produced a comprehensive night flight training program and increased the training hours per session from 2 to 4 hours;**
   b. **This capability was demonstrated successfully to the C-NLOPB.**

5. **Requirement 5:** A Fatigue Management Program (FMP) is in place for helicopter transport pilots and First Response SAR pilots. The FMP is customized to account for the operating conditions in the C-NL Offshore Area and the demographic make-up of helicopter pilots working in the Industry.
   a. **A FMP is in place for the aircrew personnel; and**
   b. **The FMP will be integrated with the SMS program to ensure that fatigue is monitored on a continuous basis**
6. **Requirement 6:** An FMP for maintenance personnel is in place, and the FMPs for pilots and maintenance personnel are integrated with the Helicopter Service Provider's safety management system (SMS).
   a. **A FMP is in place for the maintenance personnel; and**
   b. **The FMP will be integrated with the SMS program to ensure that fatigue is monitored on a continuous basis**
7. **Requirement 7:** Periodic exercises involving the key responders (e.g., Cougar First Response SAR resources and DND SAR resources) are conducted to simulate the search for a helicopter that has ditched at night, and the rescue of its occupants.
   a. **Coordination meetings and a tabletop exercise with DND have been planned.**
8. **Requirement 8:** Studies of nocturnal behaviours of birds that seasonally migrate along the east coast of Newfoundland be commenced, and there is a formal commitment to employ findings to develop appropriate mitigation if the studies demonstrate elevated risk caused by nocturnal bird movements.
   a. **A report has revealed that the risk posed by birds in flight is less than during the night. The only exception is during the dawn and dusk periods when the gulls migrate between nesting areas and feeding areas.**
   b. **Cougar Helicopters will follow established departure and arrival routes and adhere to the St. John's airport wildlife program, in accordance with Canadian Aviation Regulations (CAR), to mitigate any potential conflict.**

13 Recommendations

Since all of the concerns with respect to night flight operations have been addressed satisfactorily, the following is recommended:

a. The plan for returning to night operations as described in this report be accepted;
b. Cougar Helicopters return to night passenger operations.

Appendix A – Schedule

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
1				**1**	**93%**	**NIGHT READINESS STATUS**	**84 days**	**Mon 04/06/12**	**Thu 27/09/12**
2		Cougar		1.1	100%	Program Start	0 days	Mon 04/06/12	Mon 04/06/12
3		**GAC**		**1.2**	**100%**	**Project Management Plan**	**9 days**	**Wed 06/06/12**	**Mon 18/06/12**
4		GAC		1.2.1	100%	Develop PM Plan	5 days	Wed 06/06/12	Tue 12/06/12
5		**GAC**		**1.2.2**	**100%**	**WBS**	**5 days**	**Wed 06/06/12**	**Tue 12/06/12**
6		GAC		1.2.2.1	100%	Develop WBS	3 days	Wed 06/06/12	Fri 08/06/12
7		CFO		1.2.2.2	100%	WBS Review	2 days	Mon 11/06/12	Tue 12/06/12
8		CFO		1.2.2.3	100%	WBS Approval	0 days	Tue 12/06/12	Tue 12/06/12
9		CFO		1.2.3	100%	Plan Review by Cougar Senior Staff	2 days	Wed 13/06/12	Thu 14/06/12
10		CFO		1.2.4	100%	Plan Publication	2 days	Fri 15/06/12	Mon 18/06/12
11				**1.3**	**100%**	**Key Performance Indicators - Night Program**	**6 days**	**Mon 11/06/12**	**Mon 18/06/12**
12		GAC		1.3.1	100%	Develop Key Performance Indicators (KPI)	4 days	Mon 11/06/12	Thu 14/06/12
13		CFO		1.3.2	100%	KPI Approval	0 days	Thu 14/06/12	Thu 14/06/12
14		CFO		1.3.3	100%	Post KPI - Internal Web Site	0 days	Mon 18/06/12	Mon 18/06/12
15		CFO		**1.4**	**80%**	**Readiness Meetings**	**63 days**	**Tue 03/07/12**	**Thu 27/09/12**
16		GAC		1.4.1	100%	Meeting 1	1 day	Tue 03/07/12	Tue 03/07/12
17		GAC		1.4.2	100%	Meeting 2	1 day	Wed 01/08/12	Wed 01/08/12
18		GAC		1.4.3	100%	Meeting 3	1 day	Thu 23/08/12	Thu 23/08/12
19		GAC		1.4.4	100%	Meeting 4	1 day	Wed 12/09/12	Wed 12/09/12
20		GAC		1.4.5	0%	Meeting 5	1 day	Thu 27/09/12	Thu 27/09/12
21		**CFO**		**1.5**	**83%**	**Status Update to Customer**	**60 days**	**Wed 04/07/12**	**Tue 25/09/12**
22		GAC		1.5.1	100%	Status Update 1	1 day	Wed 04/07/12	Wed 04/07/12
23		GAC		1.5.2	100%	Status Update 2	1 day	Mon 16/07/12	Mon 16/07/12
24		GAC		1.5.3	100%	Status Update 3	1 day	Wed 01/08/12	Wed 01/08/12
25		GAC		1.5.4	100%	Status Update 4	1 day	Wed 29/08/12	Wed 29/08/12
26		GAC		1.5.5	100%	Status Update 5	1 day	Wed 12/09/12	Wed 12/09/12
27		GAC		1.5.6	0%	Status Update 6	1 day	Tue 25/09/12	Tue 25/09/12

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
28		CFO		**2**	**81%**	**RISK MANAGEMENT**	**77 days**	**Wed 13/06/12**	**Thu 27/09/12**
29		GAC		2.1	100%	Review Risks	5 days	Wed 13/06/12	Tue 19/06/12
30		GAC		2.2	100%	Update Risk Assessent	5 days	Wed 20/06/12	Tue 26/06/12
31		CFO		2.3	100%	Implement Risk Mitigation Actions	5 days	Wed 27/06/12	Tue 03/07/12
32		CFO		2.4	0%	Post Risks on Web Sharing Site	1 day	Wed 04/07/12	Wed 04/07/12
33		**CFO**		**2.5**	**40%**	**Risk Review Meetings**	**74 days**	**Mon 18/06/12**	**Thu 27/09/12**
34		GAC		2.5.1	100%	Meeting 1	1 day	Mon 18/06/12	Mon 18/06/12
35		GAC		2.5.2	100%	Meeting 2	1 day	Wed 01/08/12	Wed 01/08/12
36		GAC		2.5.3	0%	Meeting 3	1 day	Wed 12/09/12	Wed 12/09/12
37		GAC		2.5.4	0%	Meeting 4	1 day	Thu 23/08/12	Thu 23/08/12
38		GAC		2.5.5	0%	Meeting 5	1 day	Thu 27/09/12	Thu 27/09/12
39		**CP SAR**	**1-1**	**3**	**91%**	**SAR AFCS PLAN**	**421 days**	**Mon 14/03/11**	**Mon 22/10/12**
40		**CP SAR**		**3.1**	**100%**	**Type Approval Process**	**60 days**	**Mon 14/03/11**	**Fri 03/06/11**
41		**CP SAR**		3.1.1	100%	FAA Aproval	0 days	Mon 14/03/11	Mon 14/03/11
42		**CP SAR**		3.1.2	100%	TC Identifies anomalies	14 days	Mon 14/03/11	Thu 31/03/11
43		**CP SAR**		3.1.3	100%	Sikorsky RFM Update - TC Instructions	0 days	Fri 29/04/11	Fri 29/04/11
44		**CP SAR**		3.1.4	100%	TC Approval	0 days	Mon 02/05/11	Mon 02/05/11
45		**CP SAR**		3.1.5	100%	TC Ops Evaluation Starts	1 day	Fri 20/05/11	Fri 20/05/11
46		**CP SAR**		3.1.6	100%	TC Identifies Regualtory Issues	10 days	Mon 23/05/11	Fri 03/06/11
47		**CP SAR**		**3.2**	**95%**	**Cougar Approval Process**	**345 days**	**Mon 13/06/11**	**Fri 05/10/12**
48		**CP SAR**		3.2.1	100%	Cougar Reviews Required Corrections	14 days	Mon 13/06/11	Thu 30/06/11
49		**CP SAR**		**3.2.2**	**95%**	**Two Stage Plan**	**331 days**	**Fri 01/07/11**	**Fri 05/10/12**
50		**CP SAR**		**3.2.2.1**	**100%**	**Stage 1**	**100 days**	**Fri 01/07/11**	**Thu 17/11/11**
51		**CP SAR**		3.2.2.1.1	100%	Cougar corrects SAR Manual	85 days	Fri 01/07/11	Thu 27/10/11
52		**CP SAR**		3.2.2.1.2	100%	Cougar submit SAR Manual	0 days	Wed 26/10/11	Wed 26/10/11
53		**CP SAR**		3.2.2.1.3	100%	TC Approves SAR Manual	16 days	Thu 27/10/11	Thu 17/11/11
54		**CP SAR**		3.2.2.1.4	100%	TC Approves Sim program	16 days	Thu 27/10/11	Thu 17/11/11
55		**CP SAR**	**1, 2**	**3.2.2.2**	**92%**	**Stage 2**	**174 days**	**Tue 07/02/12**	**Fri 05/10/12**
56		DIR OPS		3.2.2.2.1	100%	Review regualtory issues	22 days	Thu 01/03/12	Fri 30/03/12
57		DIR OPS		3.2.2.2.2	100%	Formulate Exemption application plan	15 days	Mon 02/04/12	Fri 20/04/12
58		DIR OPS	3	3.2.2.2.3	100%	Propose plan to TC	2 days	Mon 02/04/12	Tue 03/04/12
59		CP SAR		3.2.2.2.4	100%	Implement lessons learned in SOP and Lesson plans	114 days	Tue 07/02/12	Fri 13/07/12
60		CP SAR	4	3.2.2.2.5	100%	Do Risk Assessment aginst regulation waivers	25 days	Mon 11/06/12	Fri 13/07/12
61		CP SAR		3.2.2.2.6	90%	Write SOPs	27 days	Mon 16/07/12	Tue 21/08/12
62		DIR OPS		3.2.2.2.7	50%	Submit to TC - Lower Wx Limits & NVG Ops	3 days	Mon 20/08/12	Fri 24/08/12
63		TC		3.2.2.2.8	50%	TC approves Stage 2	30 days	Mon 27/08/12	Fri 05/10/12

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
64		**CP SAR**		**3.3**	**87%**	**SAR Training program**	**254 days**	**Wed 02/11/11**	**Mon 22/10/12**
65		**CP SAR**		3.3.1	100%	Simulator Training Evaluation	21 days	Wed 02/11/11	Wed 30/11/11
66		**CP SAR**		3.3.2	100%	SOP Trials	22 days	Thu 01/12/11	Fri 30/12/11
67		**CP SAR**		3.3.3	100%	Instructor Training Commence	42 days	Mon 02/01/12	Tue 28/02/12
68		**CP SAR**		3.3.4	100%	Initial Pilot AFCS Ground School	13 days	Wed 07/12/11	Fri 23/12/11
69		**CP SAR**		3.3.5	100%	Initial Pilot AFCS Simulator Training	43 days	Wed 01/02/12	Fri 30/03/12
70		**CP SAR**		3.3.6	100%	Aircraft DAY VMC AFCS Training	87 days	Tue 07/02/12	Wed 06/06/12
71		CP SAR		3.3.7	70%	Aircraft DAY IMC AFCS Training	55 days	Thu 07/06/12	Wed 22/08/12
72		CP SAR		3.3.8	50%	Night Training - Circuits/Emergencies/LTO	1 mon	Thu 23/08/12	Wed 19/09/12
73		CP SAR		3.3.9	0%	Aircraft Night AFCS Training	5 days	Tue 09/10/12	Mon 15/10/12
74		CP SAR		3.3.10	0%	Aircraft Night AFCS Boat Hoisting	5 days	Tue 16/10/12	Mon 22/10/12
75		CP		3.3.11	0%	Line Checks for AFCS - All Weather	5 days	Tue 16/10/12	Mon 22/10/12
76		**CP SAR**		**4**	**76%**	**SAR RESPONSE (WHEELS UP) TIME**	**86 days**	**Mon 04/06/12**	**Mon 01/10/12**
77		**CP SAR**		**4.1**	**37%**	**SAR Response Time Protocols**	**75 days**	**Wed 13/06/12**	**Tue 25/09/12**
78		**CP SAR**		**4.1.1**	**43%**	**Draft Protocols**	**70 days**	**Wed 13/06/12**	**Tue 18/09/12**
79		**CP SAR**		4.1.1.1	100%	Review Cougar SAR Response Procedures	3 days	Wed 13/06/12	Fri 15/06/12
80		**CP SAR**		4.1.1.2	50%	Dispatch Protocol for pax flights at night	10 days	Wed 01/08/12	Tue 14/08/12
81		**CP SAR**		4.1.1.3	50%	Weather Dispatch Protocols	10 days	Mon 18/06/12	Fri 29/06/12
82		**CP SAR**		4.1.1.4	0%	Review of Protocols	2 days	Mon 10/09/12	Tue 11/09/12
83		**CP SAR**		4.1.1.5	0%	Update of Protocols	5 days	Wed 12/09/12	Tue 18/09/12
84		**CP SAR**		**4.1.2**	**0%**	**Briefing Protocols**	**5 days**	**Wed 19/09/12**	**Tue 25/09/12**
85		**CP SAR**		4.1.2.1	0%	Cougar Senior Staff	1 day	Wed 19/09/12	Wed 19/09/12
86		**CP SAR**		4.1.2.2	0%	Cougar SAR Team	1 day	Thu 20/09/12	Thu 20/09/12
87		**CP SAR**		4.1.2.3	0%	Cougar Support Team	1 day	Fri 21/09/12	Fri 21/09/12
88		**CP SAR**		4.1.2.4	0%	YYT Airport Support Agencies	1 day	Mon 24/09/12	Mon 24/09/12
89		**CP SAR**		4.1.2.5	0%	DND SAR Agency & RCC	1 day	Tue 25/09/12	Tue 25/09/12

ID	OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
90	**CP SAR**		**4.2**	**100%**	**SAR Response Time Work Ups**	**62 days**	**Mon 04/06/12**	**Tue 28/08/12**
91	**CP SAR**		4.2.1	100%	SAR Response Training	50 days	Mon 04/06/12	Fri 10/08/12
92	**CP SAR**		4.2.2	100%	SAR Readiness - 20 Min Standard	0 days	Fri 22/06/12	Fri 22/06/12
93	**CP SAR**		4.2.3	100%	SAR Response Review	1 day	Wed 01/08/12	Wed 01/08/12
94	**CP SAR**		4.2.4	100%	SAR Response Training Report	1 day	Thu 16/08/12	Thu 16/08/12
95	**CP SAR**		4.2.5	100%	Amend SAR Protocols	1 day	Fri 24/08/12	Fri 24/08/12
96	**CP SAR**		4.2.6	100%	SAR Protocols Review	1 day	Mon 27/08/12	Mon 27/08/12
97	**CP SAR**		4.2.7	100%	SAR Protocols Final Approval	1 day	Tue 28/08/12	Tue 28/08/12
98	**CFO**		**4.3**	**0%**	**SAR READINESS - PUBLIC DECLARATION**	**0 days**	**Mon 01/10/12**	**Mon 01/10/12**
99	**CP**	**1-2**	**5**	**98%**	**DITCHING LOW LIGHT CONDITIONS**	**58 days**	**Wed 13/06/12**	**Fri 31/08/12**
100	**CP**		**5.1**	**100%**	**Ditich Procedure**	**16 days**	**Wed 13/06/12**	**Wed 04/07/12**
101	**CP**		5.1.1	100%	Review Ditching Procedure	5 days	Wed 13/06/12	Tue 19/06/12
102	**CP**		5.1.2	100%	Determine Ditching KPI	5 days	Wed 20/06/12	Tue 26/06/12
103	**CP**		**5.1.3**	**100%**	**Update Ditiching Procedure**	**2 days**	**Wed 27/06/12**	**Thu 28/06/12**
104	**CP**		5.1.3.1	100%	Part 1: Aircraft Desent into Water	1 day	Wed 27/06/12	Wed 27/06/12
105	**CP**		5.1.3.2	100%	Part 2: In Water Procedures	1 day	Thu 28/06/12	Thu 28/06/12
106	**CFO**		5.1.4	100%	Ditiching Procedure Approval	3 days	Fri 29/06/12	Tue 03/07/12
107	**CP**		5.1.5	100%	Brief Procedure	1 day	Wed 04/07/12	Wed 04/07/12
108	**CP**		**5.2**	**100%**	**Ditiching Training**	**18 days**	**Tue 17/07/12**	**Thu 09/08/12**
109	**Tr CP**	**1-3**	**5.2.1**	**100%**	**Review Sim Training Profile**	**18 days**	**Tue 17/07/12**	**Thu 09/08/12**
110	**Tr CP**		**5.2.1.1**	**100%**	**Simulator Fidelity**	**18 days**	**Tue 17/07/12**	**Thu 09/08/12**
111	**Tr CP**		5.2.1.1.1	100%	Review Sim Fidelity for Ditching Training	3 days	Tue 17/07/12	Thu 19/07/12
112	**Tr CP**		5.2.1.1.2	100%	Report Sim Fidelity	5 days	Fri 03/08/12	Thu 09/08/12
113	**Tr CP**		**5.2.1.2**	**100%**	**Train Crews on Ditching in Sim**	**13 days**	**Thu 19/07/12**	**Mon 06/08/12**
114	**Tr CP**		5.2.1.2.1	100%	Crew Training	10 days	Thu 19/07/12	Wed 01/08/12
115	**Tr CP**	1-4	5.2.1.2.2	100%	Report On Crew Training (KPI)	3 days	Thu 02/08/12	Mon 06/08/12
116	**CP**		**5.3**	**96%**	**Ditching Demonstration**	**46 days**	**Fri 29/06/12**	**Fri 31/08/12**
117	**CP**		**5.3.1**	**100%**	**Demonstration - Aviation Advisor**	**15 days**	**Fri 29/06/12**	**Thu 19/07/12**
118	**CP**		5.3.1.1	100%	Demonstration Dates Confirmation	1 day	Fri 29/06/12	Fri 29/06/12
119	**CP**		5.3.1.2	100%	Demonstration Profile Design	3 days	Mon 02/07/12	Wed 04/07/12
120	**CP**		5.3.1.3	100%	Demonstration Trial to Cougar Dir Flight Ops	1 day	Thu 05/07/12	Thu 05/07/12
121	**CP**		5.3.1.4	100%	Demonstration Briefing to Aviation Advisor	1 day	Tue 17/07/12	Tue 17/07/12
122	**CP**		5.3.1.5	100%	Ditching Demonstration	1 day	Wed 18/07/12	Wed 18/07/12
123	**CP**		5.3.1.6	100%	Demonstration Debrief	1 day	Thu 19/07/12	Thu 19/07/12

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
124	✓	**CP**		**5.3.2**	**100%**	**Demonstration - Petroleum Board**	**7 days**	**Mon 13/08/12**	**Tue 21/08/12**
125	✓	**CP**		5.3.2.1	100%	Demonstration Dates Confirmation	1 day	Mon 13/08/12	Mon 13/08/12
126	✓	**CP**		5.3.2.2	100%	Demonstration Profile Design	2 days	Tue 14/08/12	Wed 15/08/12
127	✓	**CP**		5.3.2.3	100%	Demonstration Trial to Cougar Dir Ops	1 day	Thu 16/08/12	Thu 16/08/12
128	✓	**CP**		5.3.2.4	100%	Demonstration Briefing to Aviation Advisor	1 day	Fri 17/08/12	Fri 17/08/12
129	✓	**CP**		5.3.2.5	100%	Ditching Demonstration	1 day	Mon 20/08/12	Mon 20/08/12
130	✓	**CP**		5.3.2.6	100%	Demonstration Debrief	1 day	Tue 21/08/12	Tue 21/08/12
131		**CP**		**5.3.3**	**88%**	**Ditching Low Light Report**	**8 days**	**Wed 22/08/12**	**Fri 31/08/12**
132	✓	**CP**		5.3.3.1	100%	Report Preparation	5 days	Wed 22/08/12	Tue 28/08/12
133	✓	**CP**		5.3.3.2	100%	Report Review	2 days	Wed 29/08/12	Thu 30/08/12
134		**CP**		5.3.3.3	0%	Report Delivery to the Customer	1 day	Fri 31/08/12	Fri 31/08/12
135		**CP SAR**		**6**	**77%**	**NIGHT VISION GOOGLE (NVG) IMPLEMENTATION**	**299 days?**	**Tue 07/02/12**	**Fri 29/03/13**
136	✓	**CP SAR**		**6.1**	**100%**	**Night Flying Unaided Training**	**130 days**	**Mon 04/06/12**	**Fri 30/11/12**
137	✓	**CFO**		6.1.1	100%	Night Flight Unaided Readiness Review - Director Operations	1 day	Thu 05/07/12	Thu 05/07/12
138	✓			6.1.2	100%	Night Flight Training Unaided	130 days	Mon 04/06/12	Fri 30/11/12
139		**CP SAR**		**6.2**	**68%**	**Aircraft Readiness NVG**	**204 days?**	**Tue 07/02/12**	**Fri 16/11/12**
140				**6.2.1**	**80%**	**NVG Modification**	**103 days**	**Wed 27/06/12**	**Fri 16/11/12**
141	✓			**6.2.1.1**	**100%**	**First S92A Helicopter**	**52 days**	**Wed 27/06/12**	**Thu 06/09/12**
142	✓	**VIHA GM**		6.2.1.1.1	100%	NVG Audit Internal / External Lighting	1 day	Wed 27/06/12	Wed 27/06/12
143	✓	**VIHA GM**		6.2.1.1.2	100%	NVG Lighting Audit Report	15 days	Thu 28/06/12	Wed 18/07/12
144	✓	**VIHA GM**		6.2.1.1.3	100%	Order Lighting Mods Parts	30 days	Mon 02/07/12	Thu 16/08/12
145	✓	**VIHA GM**		6.2.1.1.4	100%	Implement Lighting Mods	14 days	Mon 13/08/12	Thu 30/08/12
146	✓	**VIHA GM**		6.2.1.1.5	100%	Evaluate Lighting Mods	1 day	Thu 06/09/12	Thu 06/09/12
147		**VIHA GM**		**6.2.1.2**	**0%**	**Second S92A Helicopter**	**15 days**	**Mon 29/10/12**	**Fri 16/11/12**
148		**VIHA GM**		6.2.1.2.1	0%	NVG Modification	10 days	Mon 29/10/12	Fri 09/11/12
149		**VIHA GM**		6.2.1.2.2	0%	NVG Evaluation	3 days	Mon 12/11/12	Wed 14/11/12
150		**VIHA GM**		6.2.1.2.3	0%	NVG Mod Acceptance	2 days	Thu 15/11/12	Fri 16/11/12
151		VIHA GM		6.2.2	0%	Transport Canada STC Evaluation	1 day?	Tue 07/02/12	Tue 07/02/12
152		**VIHA GM**		**6.2.3**	**67%**	**Ground Eval**	**15 days**	**Fri 07/09/12**	**Thu 27/09/12**
153	✓	**VIHA GM**		6.2.3.1	100%	Day Eval	1 day	Fri 07/09/12	Fri 07/09/12
154	✓	**VIHA GM**		6.2.3.2	100%	Night Unaided / Aided Eval	1 day	Mon 10/09/12	Mon 10/09/12
155	✓	**VIHA GM**		6.2.3.3	100%	STC Report Completed	3 days	Tue 11/09/12	Thu 13/09/12
156		**VIHA GM**		6.2.3.4	50%	STC issued By Transport Canada	10 days	Fri 14/09/12	Thu 27/09/12

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
157		**CP SAR**		**6.2.4**	**60%**	**NVG Equipment**	**94 days**	**Thu 31/05/12**	**Tue 09/10/12**
158	✓	DFO		6.2.4.1	100%	ROM Costs submitted for approval	1 day	Thu 31/05/12	Thu 31/05/12
159	✓	**CP SAR**		6.2.4.2	100%	Initial Training & Equipment Order for 2 SAR crews	1 day	Tue 03/07/12	Tue 03/07/12
160		**CP SAR**		6.2.4.3	0%	Initial Equipment Arrives for 2 SAR Crews	30 days	Wed 29/08/12	Tue 09/10/12
161	✓	DFO		6.2.4.4	100%	Submit Final Proposal to Clients for NVG Equipment/Mods/Training	1 day	Fri 06/07/12	Fri 06/07/12
162	✓	DFO		6.2.4.5	100%	Proposal Approved	5 days	Mon 09/07/12	Fri 13/07/12
163	✓	**CP SAR**		6.2.4.6	100%	Order NVG, Test Set, Helmet Mounts, NVG Ldg Lights, Lip Lights	30 days	Mon 16/07/12	Fri 24/08/12
164	✓	**CP SAR**		6.2.4.7	100%	ITAR Request Submitted	20 days	Mon 16/07/12	Fri 10/08/12
165	✓	**CP SAR**		6.2.4.8	100%	ITAR Request Approved	1 day	Mon 13/08/12	Mon 13/08/12
166		**CP SAR**		6.2.4.9	0%	NVGs & Helmets Preparation for Flight	10 days	Tue 14/08/12	Mon 27/08/12
167		**CP SAR**		**6.3**	**35%**	**SAR Crew Readiness NVG**	**53.5 days**	**Mon 03/09/12**	**Thu 15/11/12**
168		**CP SAR**		**6.3.1**	**80%**	**Phase 1 - 2 SAR Crews**	**36 days**	**Mon 03/09/12**	**Mon 22/10/12**
169	✓	**CP SAR**		6.3.1.1	100%	Ground School	3 days	Mon 03/09/12	Wed 05/09/12
170	✓	**CP SAR**		6.3.1.2	100%	NVG Training Basic	5 days	Thu 06/09/12	Wed 12/09/12
171		**CP SAR**		6.3.1.3	0%	NVG Flight Training S-92	2 days	Fri 19/10/12	Mon 22/10/12
172		**CP SAR**		**6.3.2**	**13%**	**Phase 2 - Remainder SAR Crews**	**32.5 days**	**Tue 02/10/12**	**Thu 15/11/12**
173		**CP SAR**		6.3.2.1	50%	Ground School	5 days	Tue 02/10/12	Thu 25/10/12
174		**CP SAR**		6.3.2.2	0%	NVG Flight Training Basic	10 days	Thu 25/10/12	Thu 08/11/12
175		**CP SAR**		6.3.2.3	0%	NVG Flight Training - S92	5 days	Thu 08/11/12	Thu 15/11/12
176	✓	**CP SAR**		**6.4**	**100%**	**Cougar Readiness NVG**	**65 days**	**Wed 04/07/12**	**Tue 02/10/12**
177	✓	**CP SAR**		6.4.1	100%	Cougar NVG Operations Document Prepared	15 days	Wed 04/07/12	Tue 24/07/12
178	✓	**CP SAR**		6.4.2	100%	NVG Ops submitted to TC for Approval	15 days	Wed 01/08/12	Tue 21/08/12
179	✓	**CP SAR**		6.4.3	100%	Cougar Ops Manual Modified for NVG Ops	5 days	Wed 22/08/12	Tue 28/08/12
180	✓	**CP**		**6.4.4**	**100%**	**NVG Readiness Report Completed**	**25 days**	**Wed 29/08/12**	**Tue 02/10/12**
181	✓	CP		6.4.4.1	100%	SAR NVG Readiness	1 day	Tue 02/10/12	Tue 02/10/12
182	✓	CP		6.4.4.2	100%	Cougar Pax Night Transport Readiness	1 day	Wed 29/08/12	Wed 29/08/12
183		**CP SAR**		**6.5**	**42%**	**SAR Program Audit**	**22 days**	**Mon 24/09/12**	**Tue 23/10/12**
184	✓	**CP SAR**		6.5.1	100%	Review Cougar SAR Program - Outside Auditors	3 days	Mon 24/09/12	Wed 26/09/12
185	✓	**CP SAR**		6.5.2	100%	Report on Cougar SAR Audit	1 day	Thu 27/09/12	Thu 27/09/12
186		**CP SAR**		6.5.3	0%	Cougar Audit Response	5 days	Fri 28/09/12	Thu 04/10/12
187	✓	CFO		6.5.4	100%	**DECLARE COUGAR READINESS NIGHT SAR**	1 day	Fri 05/10/12	Fri 05/10/12
188				6.5.5	0%	**DECLARE COUGAR READINESS PAX TRANSPORT NIGHT Ops**	1 day	Tue 23/10/12	Tue 23/10/12
189		CFO		6.5.6	0%	**DECLARE COUGAR NIGHT SAR - NVG**	1 day	Tue 23/10/12	Tue 23/10/12

ID		OPI	Minutes	WBS	% Complete	Task Name	Duration	Start	Finish
190		**CP**		**7**	**80%**	**PERSONNEL FATIGUE MANAGEMENT**	**50 days**	**Mon 25/06/12**	**Fri 31/08/12**
191		**CP**		7.1	100%	Conduct Air Crew Duty Cycle - Fatigue Management Survey	10 days	Mon 25/06/12	Fri 06/07/12
192		**CP**		7.2	100%	Conduct Ground Crew Duty Cycle - Fatigue Management Survey	10 days	Mon 09/07/12	Fri 20/07/12
193		**CP**		7.3	0%	Update Duty Cycle Policy	5 days	Mon 23/07/12	Fri 27/07/12
194		**CP**	1-5	7.4	75%	Conduct Aircrew FM Training	10 days	Mon 30/07/12	Fri 10/08/12
195		**CP**	1-6	7.5	75%	Conduct Maintenance FM Training	10 days	Mon 13/08/12	Fri 24/08/12
196		**CP**		7.6	100%	FM Training Report Completed	5 days	Mon 27/08/12	Fri 31/08/12
197		**CP SAR**		**8**	**6%**	**DND SAR - COUGAR COOP**	**89 days**	**Mon 16/07/12**	**Thu 15/11/12**
198		**CP SAR**		8.1	100%	Initiate Contact DND SAR and RCC Halifax	1 day	Mon 16/07/12	Mon 16/07/12
199		**CP SAR**		8.2	50%	Meetings to Discuss Collaboration	1 day	Fri 12/10/12	Fri 12/10/12
200		**CP SAR**		8.3	0%	Review of Respective SAR Procedures	1 day	Mon 15/10/12	Mon 15/10/12
201		**CP SAR**		8.4	0%	Harmonization of SAR Procedures and Protocols	5 days	Tue 16/10/12	Mon 22/10/12
202		**CP SAR**		8.5	0%	Develop Joint Operating Procedure	5 days	Tue 23/10/12	Mon 29/10/12
203		**CP SAR**		8.6	0%	Joint Staff Planning Exercise	3 days	Tue 30/10/12	Thu 01/11/12
204		**CP SAR**		8.7	0%	Report on DND / COUGAR SAR Collaboration	10 days	Fri 02/11/12	Thu 15/11/12
205		**GAC**		**9**	**79%**	**BIRD STUDY**	**36 days**	**Tue 24/07/12**	**Tue 11/09/12**
206		**GAC**		9.1	100%	Review Outcome of Bird Study	10 days	Tue 24/07/12	Tue 07/08/12
207		**CP**		9.2	100%	Evaluate Impact on Night Ops	10 days	Tue 07/08/12	Mon 27/08/12
208		**CP**		9.3	25%	Amend Cougar Night Ops Procedures	5 days	Mon 03/09/12	Mon 10/09/12
209		**CP**		9.4	0%	Brief Crews on Night Ops Procedures - Bird Avoidance	2 days	Mon 10/09/12	Tue 11/09/12
210		**DFO**		**10**	**100%**	**FINAL REPORT**	**43 days**	**Mon 30/07/12**	**Wed 26/09/12**
211		GAC		10.1	100%	Develop Draft Report	25 days	Mon 30/07/12	Fri 31/08/12
212		DFO		10.2	100%	Internal Cougar Review	2 days	Mon 03/09/12	Tue 04/09/12
213		DFO		10.3	100%	Steering Group Review	3 days	Wed 05/09/12	Fri 07/09/12
214		DFO		10.4	100%	Final Report	3 days	Mon 10/09/12	Wed 12/09/12
215		DFO		10.5	100%	Final Review	1 day	Tue 25/09/12	Tue 25/09/12
216		DFO		10.6	100%	Deliver to the Board	1 day	Wed 26/09/12	Wed 26/09/12

Appendix B – Simulation Fidelity (Excerpt from Paper Written by Keith Gladstone et al)

SYNTHETIC ENVIRONMENT FIDELITY

1. **Definition of Fidelity**. The issue of simulation fidelity is one that needs to be addressed before procuring a SE capability. There are in fact many myths about simulation fidelity that have become accepted as truths, some of which has driven simulation acquisition and training strategies in the past. Furthermore, there are so many definitions of fidelity that the term has become vague, even though it is used as though it is understood by everyone to mean the same thing:

> "There is no single definition of fidelity. Attempts to make the term less vague have caused distinctions to proliferate; at least 22 different definitions have been used in the literature to refer to different kinds of fidelity (physical, equipment, psychological, perceptual, functional, procedural, task, logistic, threat, etc.). Each of these definitions could be appropriate in some application." [28]

2. The first place to start is to examine various definitions for fidelity. The following provides a number of views within the context of SE training[29]:

a. Definition of Fidelity: 1. The quality or state of being faithful, 2. The degree to which an electronic device accurately reproduces its effect;

b. Environment Fidelity: The extent to which the simulator duplicates motion cues, visual cues, and other sensory information from the task environment;

c. Equipment Fidelity: The degree to which the simulator duplicates the appearance and feel of the real system;

d. Psychological Fidelity: the degree to which the trainee perceives the simulation to be a believable surrogate for the trained task; and

e. Task Fidelity: This is the correspondence between the tasks performed on a simulator and the same tasks performed on the actual equipment.

3. The former NATO Advisory Group for Aerospace Research & Design (AGARD) in 1980 provides an alternative view for fidelity (AGARD, 1980) [30]:

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[28] Fidelity and Validity in Distributed Interactive Simulation, IDA DOCUMENT D- 1066, by Norman E. Lane and Earl A. Alluisi, November 1992, page 5.
[29] Simulation Fidelity: A Concept Paper, US Army Research Institute for the Behavioral and Social Sciences, 1980, page 2.

a. **Objective Fidelity**: "This provides an engineering standard and is the degree to which a simulator would be observed to reproduce its real-life counterpart aircraft, in flight, if its form, substance, and behaviour were sensed and recorded by a non-physiological instrumentation system onboard the simulator. By including both equipment and environmental cues, this definition can encompass all pertinent dynamic cue timing and synchronization aspects of simulator fidelity."

b. **Perceptual Fidelity**: "This provides a psychological/ physiological standard and is the degree to which the flight crew subjectively perceives the simulator to reproduce its real-life counterpart aircraft, in flight, in the operational task situation. The requirement that the operational equipment be considered in the context of the task situation ensures that not only cue timing and synchronization, but also cue priority effects, are taken into account."

4. This definition stresses the importance of differentiating between the fidelity of systems and the fidelity of environment. It is this latter characteristic that has the greatest impact on training outcomes.

5. **Fidelity Drivers**. In addition to definitions of fidelity, there are four distinct fidelity drivers that must be considered: [31]

a. **Mission(s) or Mission Segment to be Simulated**: Each simulator or simulation system is designed to train for a specific mission or subset of a mission. From this mission, the tasks and subtasks are determined. The degree of proficiency to be achieved for these tasks that are to be performed by the operator will drive the level of fidelity for the systems and subsystems involved in these tasks.

b. **Objectives of the Simulation**: Detailing the objectives or purpose of the simulation will drive the fidelity requirements. It can include but not be limited to practice of skills, reinforce acquisition and retention of job-relevant knowledge or to evaluate new concepts. The activities or tasks required to support these objectives will have an impact on the level of simulation required.

c. **Fidelity Dimensions**: The three categories of fidelity dimensions are as follows:

[30] A Handbook of Flight Simulation Fidelity Requirements, J. Rehman, FAA/DOT CT-TN95/46, Dec 1995, page 8.
[31] Fidelity and Validity in Distributed Interactive Simulation, IDA DOCUMENT D- 1066, by Norman E. Lane and Earl A. Alluisi, November 1992, page 1-14.

i. Simulator: This category addresses the simulated system itself. It is concerned with the look and feel that is a result of the physical, sensory and perceptual variables employed;

ii. Operator: These are the drivers the determined the type, scope and depth of tasks with the associated task loading to be performed by the operator; and

iii. Process/Events External to Simulator: This class is concerned with the external interactive events in which the simulator and the operator will be involved.

d. **Simulation Components**: This is similar to the categories discussed above. It involves local and global components. The local components are a part of the simulator and its immediate environment. The global components are defined by external processes and environments with which the local components interact. By breaking down the components into definable areas will allow the training authority to decide the required level of fidelity.

6. **Suspension of Disbelief**. Even with the modern advances in computer systems, no simulation completely replicates the real world. Even if every event, entity and physical properties were simulated perfectly, it is still only a simulation and the real world consequences do not apply, i.e. an aircraft crash does not cause fatalities in a simulation. Regardless, it is important that the trainee feel immersed in the virtual environment (VE) for the training to be effective. This effect can be as important, if not more, than the degree of simulation fidelity. As stated in the paper, Sense of Presence in Virtual Training,

> "the main rationale for the use of Virtual Environments (VE) in learning and training contexts relies in the possibility of making significant first person experiences of the knowledge and skills to be trained. In order to achieve this goal, the learning experience should seem real and engaging to the participants, as "if they were in there": they should feel (emotionally and cognitively) present in the situation. The sense of presence experienced by learners in Virtual Environments training can be thus considered as a key feature to ensure the efficacy of virtual training and the following transfer of knowledge and skills from the training context to the "real life" ones." [32]

7. While the term used in the reference that describes the tendency for the trainee to accept the VE situation as real is "presence", another term that is used more often is "suspension of disbelief" (SD). [33] This suspension, according to the literature, has more

[32] Sense of Presence in Virtual Training, Fabrizia MANTOVANI, Gianluca CASTELNUOVO, Ios Press, 2003, Amsterdam, The Netherlands, page 168.
[33] Ibid, page 170.

to do with reality than realism. In other words, suspension of disbelief is not solely dependent on the replication of the hardware and simulator response to inputs. It has more to do with a conglomeration of factors that convince that trainee that the experience that the trainee is undergoing is plausible. The achievement of this state is very important for the successful Transfer of Training (ToT).

8. Factors that affect the outcome of SD can be listed in four separate areas: perceptual features, individual factors, content characteristics and interpersonal, social and cultural context. [34]

a. **Perceptual Realism**: This includes the graphic vividness of VEs and other "technological" features. In other words, how real is the virtual world? While this has some bearing on SD, there are other equally important factors:

b. **Individual Factors**: This factor has to do with imaginations and the mind's ability to connect the various artefacts within a VE. Much in the same way that a reader can construct an image and feel the experience of a character in a well written book, a trainee in the VE can piece together a creation of reality in the VE based on a limited number of artefacts. The key, as in writing, is what artefacts need to be presented to enable the trainee to do this. This has very little to do with realism and explains why PTT and FTD can be just effective as a training venue as compared to a Full Flight Simulator.

c. **Content Characteristics**: This involves the creation of a story and the trainee's willingness to play a lead role in the outcome of the story. In training, the story is the scenario in which the trainee will participate, i.e. convoy escort with an armed helicopter in a threat environment. The trainee's involvement and the ability to impact the outcome by their actions will contribute significantly to SD.

d. **Interpersonal, Social and Cultural Context**: Trainees will feel a greater willingness to succumb to SD when interacting with others in the same time and virtual space and are also engaged in support of the same operational training goals.

9. SD can have a positive impact on the transfer of training. However, it is important to realize it is more than just equipment and software. As the authors of Sense of Presence in Virtual Training conclude:

> "The sense of presence makes the learning experience engaging, relevant and trainees will experience thoughts, emotions and behaviors similar to those they could experience in a real-life situation, thus allowing the creation of a recallable

[34] Ibid, page 170-179.

experience. The user can make mistakes accepting failures and reflecting over them, since he/she makes them in a protected environment and so they do not have such severe consequences on the real world and on the user's self-esteem. The sense of presence in the training situation is important also after the learning experience, when it is matter to recall it to solve problems and manage situations in the professional context: the higher the sense of presence during the experience, the higher the emotional involvement, the higher possibility of recalling, through associations, the training situation." [35]

10. **Fidelity Summary**. The key points associated with simulation fidelity are:

a. There are two types of fidelity: objective and perceptual. Objective has to do with hardware and accurate replication of the real environment; perceptual is the degree to which the flight crew subjectively perceives the simulator to reproduce its real-life counterpart aircraft, in flight, in the operational task situation. It is this latter characteristic that has the greatest impact on training outcomes;

b. There are four drivers of fidelity: mission to be simulated, objectives of the simulation, fidelity dimensions, and simulation components. Matching the level of simulation fidelity with the training tasks is a difficult and onerous task, but one that is a crucial step in determining a training solution; and

11. The definition of fidelity depends on what aspect of the SE is being discussed. Therefore, the definition can range from fidelity of equipment to fidelity of experience. The AGARD definition touches on two terms: objective and perceptual. It is this latter term that has the most relevance as it is what will convince the trainee that the training experience is real even though it is in the SE.

12. "Suspension of Disbelief" is key for effective transfer of training (ToT). Suspension of disbelieve is not solely dependent on the replication of the hardware and simulator response to inputs. It has more to do with a conglomeration of factors that convince the trainee that the experience they went through is plausible, and their actions affected the outcome of the simulation. Contrary to conventional wisdom, fidelity is not a driving factor.

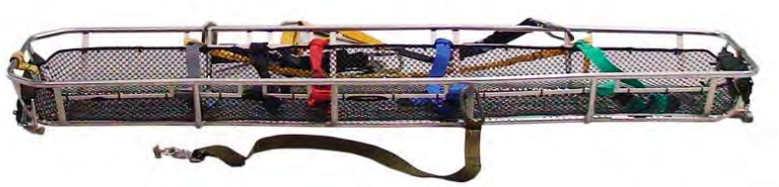
13. All of the above will drive the level of fidelity required to achieve the training objectives. Matching the level of simulation fidelity with the training tasks is a difficult and onerous task; one that is often overlooked. The completion of a training needs analysis (TNA) is the first, crucial step in developing a training solution, yet so often, we find the solution to a problem that was never articulated. That the TNA drives requirements cannot be overstated.

[35] Ibid, page 178.

The degree of fidelity required is driven more by instructional strategy than the need to replicate the system being simulated.

Appendix C – Cougar SAR Equipment

1. Stokes Litter (lifting bridle) 2ea photo # 1



2. Rescue Basket 2ea photo # 2, see spec sheet

3. Basket Stretcher (Ferno 71) 1ea photo # 3

4. Marine Salvage Pump 2ea photo # 4

5. SKAD (One raft, one bundle) 3ea photo # 5

6. Guide Line 3ea photo # 6
7.

8. Rescue Strop (horse collar) 3ea photo # 7, see spec sheet

9. Axel Cut (manual cable cutter) 4ea photo # 8

10. Cable Splice Plate & Hook 1ea photo # 9

11. One Man Life Raft 2ea

12. Emergency Recovery System 1ea photo # 10

13. Thermal Recovery Capsule 1ea

14. Medical Kit

a. Medical Kit (YYT, Primary) 2ea
b. Medical Kit (YYT, Secondary) 2ea
c. Medical Kit (YYT, Accessory) 1ea
d. Airway Mgmt Kit (YYT) 2ea
e. Immobilization Kit (YYT) 2ea

15. Lifepak 1000, AED (YYT) 1ea

16. Oxygen Cylinder (E, size 5) 4ea

17. Oxygen Cylinder (D, size 3) 4ea

18. Tie down / Comms Bag (YYT) various

19. Dual Rescue Hoist 2ea

20. Night Sun Searchlight 1ea

21. NVG 1pr

22. FLIR 1 ea photo # 14 (a & b)

23. Sea Tray (water dam) 1 ea

24. Stacking Litter System 1ea photo # 15

25. Adjustable air ambulance stretcher (Ferno 9) 1ea photo # 16

26. SAR Harness (CRH)(complete) 6ea

27. Rescue Specialist (personal kit) 1 per man (Personal kit items include)

- Whites SAR Surface Suit
- NRS Rescue Dry Suit
- Gentex, SPH-5 or HGU-56 Helmet
- Bravo Life Vest
- Aerial Tac-Air Survival Vest
- Survival Knife / Dive Knife
- Environmental Clothing
- Thermal Under Garment
- Surface Swim Gear (RM), incl Mask, Fins, Snorkel
- Head lamp / VIP Survival light
- Protective Gloves / Knee Pads

Non Individual Issue Items Include

- LV II Emergency Breathing System (HUEBA)
- Res Q Fix PLB (Aqua Fix)
- Portable VHF Two-Way Radios with Helmet adaptor.

Appendix D – Simulator Training Plan

Instructor Outline and Standards

Night Currency Training

1.0 Overview

This session will consist of a four hour simulator block in which both crewmembers will perform both Pilot Flying and Pilot Monitoring duties. In conjunction with the night currency exercises, there will be an operational flight from St. John's International (CYYT) an offshore Jack-up installation called the "Treasure Swan". The Operational portion will begin from the airport of departure up to and including the offshore instrument approach; once the crew becomes visual with the installation, the night currency session shall begin. Each crewmember will complete a minimum of 5 Take-Offs and Landings with all associated emergency/malfunction exercises demonstrated to a satisfactory level. The Operational flight will then resume once the aircraft departs for the final time from the helideck and returns to the airport of departure. At the session mid-point, crews shall be given a ten-minute break.

The operational portion of the session provides a valuable opportunity for the instructor to evaluate the crew's ability to carry out a night offshore flight while introducing scenarios requiring technical knowledge, aircraft handling and CRM core principles such as: effective communication, problem solving, workload management and situational awareness.

A "Qualifying Standard" has been created for each exercise to be assessed during this session. The purpose of these standards is to create a framework for instructors to evaluate the crew's performance for each exercise and apply the 4-point marking scale provided in paragraph 4.0. The numerical reference for each qualifying standard is also located on the Instructor Worksheet for quick reference. Company crew position (Captain/First Officer) must be taken into account while applying these standards.

2.0 Session Particulars

The aircraft will be placed on the threshold of runway 11 in St. John's with engines running for an LTS RVR 600 departure. The departure from runway 11 is preferred as it provides a straight out departure to the on course and the RVR 600 departure without the aid of touchdown zone lighting provides limited visual cues, a realistic scenario to which crews should be exposed.

The "night cycle" exercises have been constructed to have each crewmember conduct his/her night landings and departures in succession; for example, the LH pilot will conduct all his/her landing cycles in succession then complete all his/her takeoff cycles in succession. This technique of repetitive training has proved beneficial by placing timely focus on noted areas of difficulty.

Although current customer requirements state only 3 offshore night cycles are required, the crew will complete 5 cycles during this session; this will also satisfy the Transport Canada Bi-Annual requirement.

This syllabus contains a number of engine failures at various stages throughout the night cycles however; it also contains malfunctions that will affect various systems such as control/auto-flight and avionics/display. Some abnormal conditions introduced may seem relatively benign in nature however, serve as a potential distraction for the crew and will aid the instructor in assessing CRM principles as outlined in paragraph 1.0 above.

The crew will be expected to depart the offshore installation and fly the enroute and subsequent ILS approach to runway 16 without the aid of the Flight Control Computers. Although it is important for both crewmembers to experience the flight characteristics without the aid of the FCC's, it is essential that company PIC's be proficient in handling the aircraft with relative accuracy. For professional development, First Officers should also be given the opportunity to fly the aircraft for a period of time. Should the simulator crew pairing be 2 Captains, each shall have an opportunity to fly the approach.

3.0 Simulator Pre-Briefing

As a minimum, Instructors should review the following points with the crew:

1. Ensure crews understand the night deceleration profile including all associated callouts and actions.
2. Review the OEI procedures for the various stages of the approach, giving particular attention to a power loss just prior to the Decision call during landing.
3. Review the AEO missed approach procedure during the various stages of the approach (both prior to and after the ½ mile point).
4. Discuss how the use of RADALT hold may hinder an OEI missed approach procedure (The collective will lower should the collective trigger be released while coupled to RADALT).
5. Review the OEI procedures/profiles for the various stages of takeoff including pilot callouts and actions during the reject, initial flyaway and various segments of the OEI climb.
6. Review the Emergency Descent procedure and Ditching including all associated callouts and actions.
7. Discuss the routing and installation particulars using the applicable publications. Contrary to the Treasure Swan approach plate, ensure crews are aware the helideck height is **120** feet ASL and MDA for the instrument approach is **170** feet.

4.0 Marking Scale

When applying the 4-point scale, award the mark that best describes the weakest element(s) applicable to the candidate's performance. Remarks to support mark awards of 1 or 2 must link to a safety issue, a qualification standard (performance criteria), or an approved technique or procedure.

4	Above Standard	Performance remains well with the qualification standards and flight management skills are excellent	• Performance is ideal under existing conditions • Aircraft handling is smooth and precise (i.e. well within limits) • Behavior indicates continuous and highly accurate situational awareness. • Flight management skills are excellent. • Safety of flight is assured. Risk is well mitigated.
3	Standard	Minor deviations occur from the qualification standards and performance remains within prescribed limits.	• Performance meets the recognized standard yet may include deviations that do not detract from the overall performance. • Aircraft handling is positive and within specified limits. • Technical skills and knowledge meet the required level of competency. • Behavior indicates that situational awareness is maintained. • Flight management skills are effective. • Safety of flight is maintained. Risk is acceptably mitigated.
2	Basic Standard	Major deviations from the qualification standards occur which may include momentary excursions beyond prescribed limits but these are recognized and corrected in a timely manner.	• Performance includes deviations that detract from the overall performance, but are recognized and corrected within an acceptable timeframe. • Aircraft handling is performed with limited proficiency and/or includes momentary deviations from specified limits. • Technical skills and knowledge reveal limited technical proficiency and/or depth of knowledge. • Behavior indicates lapses in situational awareness that are identified and corrected by the crew. • Flight management skills are effective but slightly below standard. Where applicable, some items are only addressed when challenged or prompted by other crewmembers. • Safety of flight is not compromised. Risk is poorly mitigated.

1	Below Standard	Unacceptable deviations from the qualification standards occur which may include excursions beyond prescribed limits that are not recognized or corrected in a timely manner.	• Performance includes deviations that adversely affect the overall performance, are repeated, have excessive amplitude, or for which recognition and correction are excessively slow or nonexistent, or the aim of the exercise was not achieved. • Aircraft handling is rough or includes uncorrected or excessive deviations from specified limits. • Technical skills and knowledge reveal unacceptable levels of technical proficiency and/or depth of knowledge. • Behavior indicates lapses in situational awareness that are not identified or corrected by the pilot/crew. • Flight management skills are ineffective, unless continuously challenged or prompted by other crew members. • Safety of flight is compromised. Risk is unacceptably mitigated.

5.0 Simulator Session

Instructors will assess the following:

5.1 RVR 600 Departure

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Demonstrate adequate knowledge of the regulations that govern the LTS RVR 600;
2. Complete a proper Take-off briefing with specific mention of the LTS departure, CDP, and if required, takeoff alternate;
3. Complete required callouts during hovering and throughout the takeoff;
4. Adjust the flight controls as to maintain longitudinal alignment on the centerline and a 10-15 foot wheel height above the runway during the acceleration until reaching CDP (70KIAS);
5. Adjust the flight controls to achieve 80 KIAS (Vy) and maintain 750-1000 fpm rate of climb;
6. Correctly engage automation with standard phraseology;
7. Thru 400 feet AAE, accomplish the After Takeoff checklist.

5.2 Climb

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Establish communication with ATC using correct phraseology;
2. Establish and maintain proper vertical speed and airspeed as well, manage power with the appropriate level of automation;
3. Adhere/comply with ATC instructions or clearances;
4. Maintain a Sterile Cockpit thru MSA;
5. Use proper calls and crew co-ordination.

5.3 Cruise

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain Altitude in accordance with the ATC clearance;
2. Properly use automation to configure the aircraft in cruise flight;
3. Manage power to achieve maximum 70% torque or Vno (as appropriate);
4. Perform the Cruise checklist and complete all associated items;
5. Ensure navigation is conducted in accordance with ATC clearances/instructions and adherence to Company procedures in terms of DCP setup and use of automation.
6. Use proper calls and crew coordination.

5.4 Descent

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Perform the Descent Checklist and complete all associated items;
2. Properly select, tune and identify appropriate navigation aids associated with the proposed arrival including proper use of the UNS and setting of the DCP's;
3. Comply with all ATC clearances, instructions and restrictions;
4. Properly plan and use automation to enter and establish the descent profile maintaining 500 to 1000 fpm descent rate;
5. Properly use automation and crew calls to level the aircraft at the preselected altitude;
6. Complete the "Before Landing Checklist" and all associated items 5 miles from the destination while operating in VMC and 5 miles from the IAF or the IF while operating in IMC.

5.5 NDB/ARA Approach

***Qualifying Standard**:*

Base the assessment on the crew's ability to:

1. Obtain updated weather conditions from the installation for approach planning;
2. Complete a thorough approach briefing including delegation of PM and PF duties and procedure to be flown;
3. Properly use automation and crew calls;
4. Ensure area is clear prior to commencing descent from MSA;
5. If applicable, accurate outbound tracking, timing and speed;
6. Maintain the applicable altitude until aircraft is established within 5 degrees of the inbound track;
7. Maintain the final approach track within +/- 5 degrees;
8. Accurately control airspeed and altitude at the MDA;
9. At 1.5 miles, apply an appropriate heading offset which results in a 10 degree displacement of the NDB needle(s) and radar target from the inbound track;
10. If visual prior to the MAP, safely maneuver the aircraft toward the landing environment;
11. Transfer control when appropriate;
12. If applicable, initiate the proper missed approach procedure.
13. Use proper calls and crew co-ordination.

5.6 Night Approach/Landing Profile

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Establish the aircraft groundspeed at 55 knots by 1NM;
2. Once visual, initiate a turn toward the target;
3. At ½ mile radar distance, deselect IAS and HDG hold functions and set the appropriate deceleration attitude (maintain RADALT hold);
4. Apply corrections to pitch if required to maintain desired closure rate;
5. Properly transfer control and duties inside ¼ mile;
6. Transition to a landing maintaining a safe OEI profile;
7. Accomplish a smooth positively controlled transition to touchdown.
8. Use proper calls and crew co-ordination.

5.7 Engine Failure During Approach Outside ½ Mile (Coupled 3 Cue)

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Recognize in a timely fashion an engine failure has occurred;
2. Maintain positive aircraft control;
3. Turn away from the target;
4. Properly select the appropriate level of automation.
5. Begin a stabilized climb while accelerating to Vy;
6. Use proper calls and crew co-ordination;
7. Perform all applicable ECL Actions;

5.8 Engine Failure Prior to LDP

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Properly interpret EICAS display and aural warning to diagnose the failure;
2. Maintain positive aircraft control;
3. Turn away from the target;
4. Adjust aircraft pitch attitude to achieve "Vtoss";
5. After achieving Vtoss, begin a climb while stabilizing the Nr at 100 percent;
6. Properly manage airspeed and power during the climb segment(s);
7. Use proper calls and crew co-ordination;
8. Perform all applicable ECL Actions;
9. Properly select the applicable automation.

5.9 Balked Approach AEO Inside ½ Mile (RADALT Coupled only)

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Promptly turn away from the target;
2. Adjust aircraft attitude to -2.5° with effective use of trim;
3. Maintain positive aircraft control;
4. Engage "Go-Around" accelerating through 55 KIAS;
5. Properly select the applicable automation;
6. Use proper crew coordination and callouts.

5.10 Ramp Open Prior to LDP

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Properly interpret EICAS display to diagnose the abnormal condition;
2. Properly communicate the condition to all crewmembers;
3. Maintain aircraft control;
4. Carry out Emergency Checklist Items for "RAMP OPEN" caution segment;
5. Use proper crew coordination and callouts.

5.11 Smoke in Baggage Prior to LDP

Base the assessment on the crew's ability to:

1. Properly interpret visual and aural warnings to diagnose the condition;
2. Maintain aircraft control;
3. Carry out Emergency Checklist Items for "SMOKE IN BAGGAGE"
4. Properly communicate the condition to the applicable agencies;
5. Use proper crew coordination and callouts.

5.12 Elevated Helideck Departure

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Complete a proper Take-off briefing;
2. Complete required callouts during hovering and throughout the takeoff;
3. Adjust collective to achieve "target torque" while maintaining helideck position;
4. Smoothly adjust cyclic control to achieve a nose down attitude of -10°;
5. Level the aircraft attitude at the "VTOSS" callout;
6. Retract landing gear and "safe" floatation at the "Positive Rate" callout;
7. Accelerate to and climb at Vy speed and set power to achieve 750-1000 fpm during climb out;
8. Correctly engage automation with standard phraseology;
9. Thru 400 feet AAE, accomplish the After Takeoff checklist.
10. Use proper crew coordination and callouts.

5.13 Elevated Helideck Departure – Engine Failure at CDP

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Properly interpret EICAS display and aural warning to diagnose the failure;
2. Promptly adjust aircraft pitch to -20° while maintaining Nr at 100 percent
3. Readjust aircraft pitch to level at the "Vtoss" callout;
4. Retract landing gear and "safe" floatation once flyaway is assured (positive rate callout);
5. Properly manage airspeed to climb at Vy and downshift power and recover Nr as required;
6. Properly select the applicable automation;
7. Carry out ECL items.
8. Use proper crew coordination and callouts.

5.14 Elevated Helideck Departure – MFD No.1 Failure at Rotation

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control and proper profile by either following the reverted MFD or by passing aircraft control;
2. Smoothly adjust cyclic control to achieve a nose down attitude of -10°;
3. Level the aircraft attitude at the "VTOSS" callout;
4. Retract landing gear and "safe" floatation at the "Positive Rate" callout;
5. Accelerate to and climb at Vy speed and set power to achieve 750-1000 fpm during climb out;
6. Correctly engage automation with standard phraseology;
7. Thru 400 feet AAE, accomplish the After Takeoff checklist;
8. Properly diagnose the malfunction;
9. Carry out the Subsequent Actions Checklist;
10. Use proper crew coordination and callouts.

5.15 Elevated Helideck Departure - Collective Trim Hardover – Down at Rotation

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control and proper departure profile;
2. Properly communicate the condition to the other crewmember(s);

3. Thru 400 feet carry out the ECL items (Trim Hardovers);
4. Carry out the Subsequent Actions Checklist;
5. Use proper crew coordination and callouts.

5.16 Engine Fire – Non Extinguishable during Climb Out

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Properly interpret the warnings (both visual and audio) to diagnose the condition;
2. Establish and maintain the aircraft in a safe flight configuration;
3. Carry out ECL Immediate Actions;
4. Use proper crew coordination and callouts.

5.17 Emergency Descent

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Conclude that an emergency descent is the correct course of action given the situation;
2. Carry out ECL Immediate Actions;
3. Initiate and stabilize the descent by using an appropriate level of automation;
4. Carry out ECL items (Emergency Descent – Power On);
5. Level the aircraft at an altitude of 200 feet (Radio Altitude) above the water surface in a smooth and controlled manner;
6. Use proper crew coordination and callouts.

5.18 Ditching

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Conclude that an aircraft ditching is the correct course of action given the situation;
2. Carry out ECL items;
3. Control the rate of descent and IAS (G/S) to touchdown;
4. Smoothly touchdown on the surface;
5. Carry out the ECL items for Emergency Evacuation - At Sea;
6. Use proper crew coordination and callouts;

7. Use the appropriate level of automation.

5.19 Main Gearbox Chip – Prior to LDP

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Properly interpret EICAS display to diagnose the condition;
2. Properly communicate the condition to all crewmembers;
3. Maintain aircraft control;
4. Use proper crew coordination and callouts;
5. Carry out ECL items for MGB CHIP.

5.20 Elevated Heli-deck Departure – ADC No.1 Fail at Rotation

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control and proper departure profile by passing aircraft control or, accurately flying aircraft attitude in relation to airspeed callouts from the Pilot Monitoring;
2. Smoothly adjust cyclic control to achieve a nose down attitude of -10°;
3. Correctly engage automation with standard phraseology;
4. Thru 400 feet AAE, accomplish the After Takeoff checklist;
5. Properly diagnose the condition;
6. Carry out the ECL items for SINGLE AIR DATA COMPUTER FAILURE;
7. Carry out the Subsequent Actions Checklist;
8. Use proper crew coordination and callouts.

5.21 Elevated Heli-deck Departure – Dual Tail Rotor Cable Failure during initial Climb

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control and climb profile;
2. Properly interpret the EICAS display to diagnose the condition;
3. Carry out the ECL items for TAIL ROTOR QUAD
4. Carry out the Subsequent Actions Checklist;
5. Use proper crew coordination and callouts.

5.22 Elevated Heli-deck Departure – Dual Autopilot Failure at Rotation

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control and proper departure profile;
2. Properly communicate the condition to the other crewmember(s);
3. Properly interpret the EICAS display to diagnose the condition;
4. Carry out the After Take-off Checklist;
5. Thru 400 feet carry out the ECL items for DUAL AUTOPILOT FAILURE;
6. Carry out the Subsequent Actions Checklist;
7. Use proper crew coordination and callouts.

5.23 Approach – ILS Category 1 RVR 1200 – Dual Autopilot Failure

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Maintain aircraft control throughout the approach and landing;
2. Properly tune and identify applicable Navigation Aids and program the UNS (if applicable).
3. Complete a thorough approach briefing with particular mention of the malfunction and it's impact on approach and landing;
4. Maintain a stabilized approach with Localizer and Glideslope remaining within full scale deflection;
5. Smoothly transition from the approach phase to the landing with minimal maneuvering;
6. Use proper crew coordination and callouts.

5.24 Use of Checklists

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Call for the appropriate checklist at the appropriate time;
2. Complete all checklists in a clear and concise manner using the proper technique (i.e. challenge/response);
3. Recall and complete all ECL Immediate Actions by memory;
4. Complete applicable memory items of the Normal Checklist by Memory;
5. Use the correct terminology.

5.25 Use of Automation

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Demonstrate both technical and operational knowledge of the auto flight system;
2. Properly select/de-select the appropriate function(s) applicable to regime of flight;
3. Use the correct crew terminology and coordination during engagement and disengagement of modes;
4. Smoothly transition from manual flight to automated flight.
5. Transition from Automated flight to Manual flight at the appropriate time using correct technique.

5.26 Passenger Briefings/Use of PA

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Make routine appropriate announcements to keep the passengers informed of the flights progress;
2. Make Emergency announcements clear and concise;
3. Make Advisory announcements without confusing or alarming the passengers;
4. Make announcements as required in a timely fashion.

5.27 Smoothness of Control

Qualifying Standard:

Base the assessment on the crew's ability to:

1. During normal operations, manipulate the aircraft flight controls in a manner which causes no abrupt or unstabilized movement of the aircraft;
2. Adhere to published Standard Operating Procedures with regard to aircraft pitch, power management, heading and yaw control.
3. Transition smoothly from manual to automated flight.

5.28 Route Knowledge

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Use applicable charts and approach plates to enhance situational awareness;
2. Demonstrate procedural knowledge of the departure aerodrome;
3. Establish contact with the applicable ATC or advisory agency within an acceptable timeframe;
4. Adhere to all Air Traffic Control Clearances and Instructions;
5. Carry out an IFR departure and establish the aircraft on the routing as cleared by Air Traffic Control;
6. Demonstrate an awareness of applicable airspace classification.

5.29 Crew Resource Management (CRM)

Qualifying Standard:

Base the assessment on the crew's ability to:

1. Effectively communicate throughout the flight; both internally and externally;
2. Utilize available resources; particularly during abnormal situations;
3. Demonstrate problem solving skills;
4. Effectively manage workload by prioritizing actions;
5. Maintain crew situational awareness;
6. Adhere to Company S.O.P's.

Night Qualification Training Instructor Worksheet

Date: ____/____/____ IN: ____:____OUT: ____:____ Flight Time:_____

Left Seat: _____ Right Seat: _____

Simulator: Gate SECURE Cabin Door CLOSED Control Loading ON Crew Strapped-In Motion ON	**IOS:** Total Reset CLEAR HUMS Exceedances ACKN Crash Suppress OFF Malfunction Summary CLEAR Snapshot recall CLEAR Map Track CLEAR Traffic Chatter OFF Paint Scheme COUGAR SimVu ON Scenario: COUGAR CYYT Rigs	**Flt time:** 4.0 **A/C:** Running **Position:** CYYT Threshold RWY11 **Weight:** 17300+4000+3200=24,500 **Fuel:** 3200lbs (Freeze ON) **CG:** Lateral -0.2/ Longitudinal 351.0 **Initial WX:** RVR 600 VV001 **Wind:** 09/05 **Turbulence:** Light **QNH:** 29.92 **OAT:** 15°c **Time of day:** Day

Note Bold Sequences Left Seat Flown

- ***Ground -*** *CGR 92 is cleared to the Treasure Swan, St. John's 4 Departure to maintain 3000, balance unchanged, Flight Planned Route, Depart RWY 11 Squawk 4712*
- ***Ground -*** *CGR 92 Read back correct, Contact Tower 120.6*
- ***Tower -*** *CGR 92 St John's Tower, Wind 090 at 05 KTS, contact Gander Center 133.15, Cleared Take-off RWY 11*

		5.1 RVR 600 Departure		
		5.2 Climb Segments		

- ***Gander -*** *CGR 92 Gander Center, Radar identified, Cleared Present position direct Treasure Swan, Maintain 3000.*

		5.3 Cruise		
		5.4 Descent		

Scenarios: Cougar CYYT Rigs, NDB 314. Through "Articulations" ensure all lights are turned ON and cranes moved.
Weather: 280T/10 Visibility 2SM, Overcast 300

- ***Treasure Swan -*** *CGR 92 Treasure Swan, we have your weather and return load, advise ready to copy*
- *Weather at _____Z, Wind 280 degrees true at 10 KTS, 3 miles in mist, Ceiling 300 Overcast, Altimeter 29.90*
- ***Treasure Swan -*** *Return load 5 Passengers, 100 lbs. cargo, Total weight 1300lbs.*
- ***Treasure Swan –*** *CGR 92, you have a green deck on Treasure Swan*

Take snapshots of the aircraft on final approach and while on deck

		5.5 Full NDB/ARA		

Night Arrivals Left Hand Seat

The crew will complete 5 night cycles. Reposition to Snapshot approximately 1.5 Nautical Miles from the installation for each approach

		5.6 Night Deceleration Profile with a **Left seat landing**		
		5.6 Night Deceleration Profile with a **landing**		
		5.7 Engine Failure Outside ½ mile (coupled 3 cue)		
		5.6 Night Deceleration Profile with a **landing**		
		5.8 Engine Failure prior to LDP – Balked Approach		
		5.9 AEO Balked Approach inside ½ mile (RadAlt hold)		
		5.10 Prior to LDP RAMP OPEN to a landing		
		5.11 Prior to LDP SMOKE IN BAGGAGE to a landing		

Night Departures Left Hand Seat

		5.12 Elevated Helideck Departure		
		5.13 Elevated Helideck Departure – Engine Failure at CDP		
		5.14 Elevated Helideck Departure – No.1 MFD Fail at CDP		
		5.15 Elevated Helideck Departure- Collective Trim Hardover (Down)		
		5.12 Elevated Helideck Departure		
		5.16 **Engine Fire** During Climb out – Non Extinguishable allow the crew to climb at least to 3000 feet prior to initiating		
		5.17 Emergency Descent		
		5.18 Ditching		

Reposition to final approach Snapshot and through articulations, rotate Helideck heading to 220° for the Right Hand Pilot's Cycles.

Night Arrivals Right Hand Seat

		5.6 **Night Deceleration Profile with a** landing		
		5.8 Engine Failure Prior to LDP – Balked Approach		
		5.6 **Night Deceleration Profile with a** landing		
		5.19 **MGB CHIP** Prior to LDP to a Landing		
		5.6 **Night Deceleration Profile with a** Landing		
		5.6 **Night Deceleration Profile with a** Landing		

Night Departures Right Hand Seat

		5.12 Elevated Helideck Departure		
		5.13 Elevated Helideck Departure – Engine Failure at CDP		
		5.20 Elevated Heli-deck Departure – ADC No.1 Fail at Rotation		
		5.21 Elevated Heli-deck Departure – **T/R QUAD** (both cables) during initial climb out thru Vy		
		5.22 Elevated Heli-deck Departure – **AUTO PILOT 1 FAIL** *and* **AUTO PILOT 2 FAIL** at CDP – **NO RESET**		

The crew will return to CYYT with both autopilots inoperative.
Remove the offshore scenario and select runway 16 for arrival.
Weather 130/05 ½ SM FG VV002 15/15 29.92 RVR 2600

		5.2 Climb Segment		
		5.3 Cruise		

Take snapshots at various stages of the approach.

- ***Gander –*** *Cougar 92 you're Radar identified, cleared direct* ***AARAN*** *maintain 2300.*
- ***Gander –*** *Cougar 92 you're cleared ILS approach Runway 16.*
- ***Gander –*** *Cougar 92, over to tower 120.6*
- ***Tower –*** *Cougar 92 the wind 130/05 Visual Range Runway 16 2600, cleared to land runway 16*

		5.23 ILS Approach Dual Auto Pilot Failure		

		5.23 ILS Approach Dual Auto Pilot Failure		

Simulator: Motion OFF SimVu OFF A/C on Threshold WX: RESET / CAVOK / NIGHT A/C Shutdown Flight Freeze ON Fill Out MACAR	**IOS:** Total Reset CLEAR HUMS Exceedances ACKN Malfunction Summary CLEAR Snapshot recall CLEAR Map Track CLEAR Screen DIM Side Buttons DIM

Night Qualification

Date_____/_____/_____
yyyy/mm/dd

PILOT Left Seat: _____ **PILOT Right Seat**: _____

A/C Type: SK92	Location:	Sim Time:	☐ VFR ☐ IFR ☐ Night

ITEM		MARK 1	2	3	4	LS	ITEM	MARK 1	2	3	4	LS
1.	600RVR T/O (Runway 11)						27. Rig T/O ADC (1) fail at CDP					
2.	Cruise						28. T/R Quad (Dual Cable) after CDP					
3.	Descent						29. Dual Autopilot Failure at CDP					
4.	NDB/ARA Approach						30. Cruise					
5.	Profile/LDG					X	31. Descent					
6.	Profile OEI prior to decouple						32. ILS F/D only Dual A/P Fail					
7.	Profile/LDG					X	33. ILS F/D only Dual A/P Fail					X
8.	Profile/OEI prior to LDP					X	34. Use of Checklist s					X
9.	Balked Approach <½ NM						35. Use of Automation					X
10.	Profile Ramp Open LDG					X	36. Passenger Briefings/ Use of PA					X
11.	Profile Smoke in Baggage LDG					X	37. Smoothness of Control					X
12.	Profile/LDG					X	38. Route Knowledge					X
13.	Rig T/O No Failures					X	39. CRM					X
14.	Rig T/O OEI at CDP					X	40. Use of Checklists					
15.	Rig T/O No.1 MFD Fail at CDP					X	41. Use of Automation					
16.	Rig T/O Coll Trim Down =CDP					X	42. Passenger Briefings/Use of PA					
17.	Rig T/O Engine Fire >CDP					X	43. Smoothness of Control					
18.	Ditching						44. Route Knowledge					
19.	Profile/LDG						45. CRM					
20.	Profile/OEI prior to LDP						46.					
21.	Profile/LDG						47.					
22.	Profile/MGB Chip prior to LDP						48.					
23.	Profile/LDG						49.					
24.	Profile/LDG						50.					
25.	Rig T/O No Failures						51.					
26.	Rig T/O OEI at CDP						52.					

☐ **Comments on back**

Training Captain: _____ **Signature:** _____

Comments

Crew: _____/_____ **Date:** yyyy / mm / dd